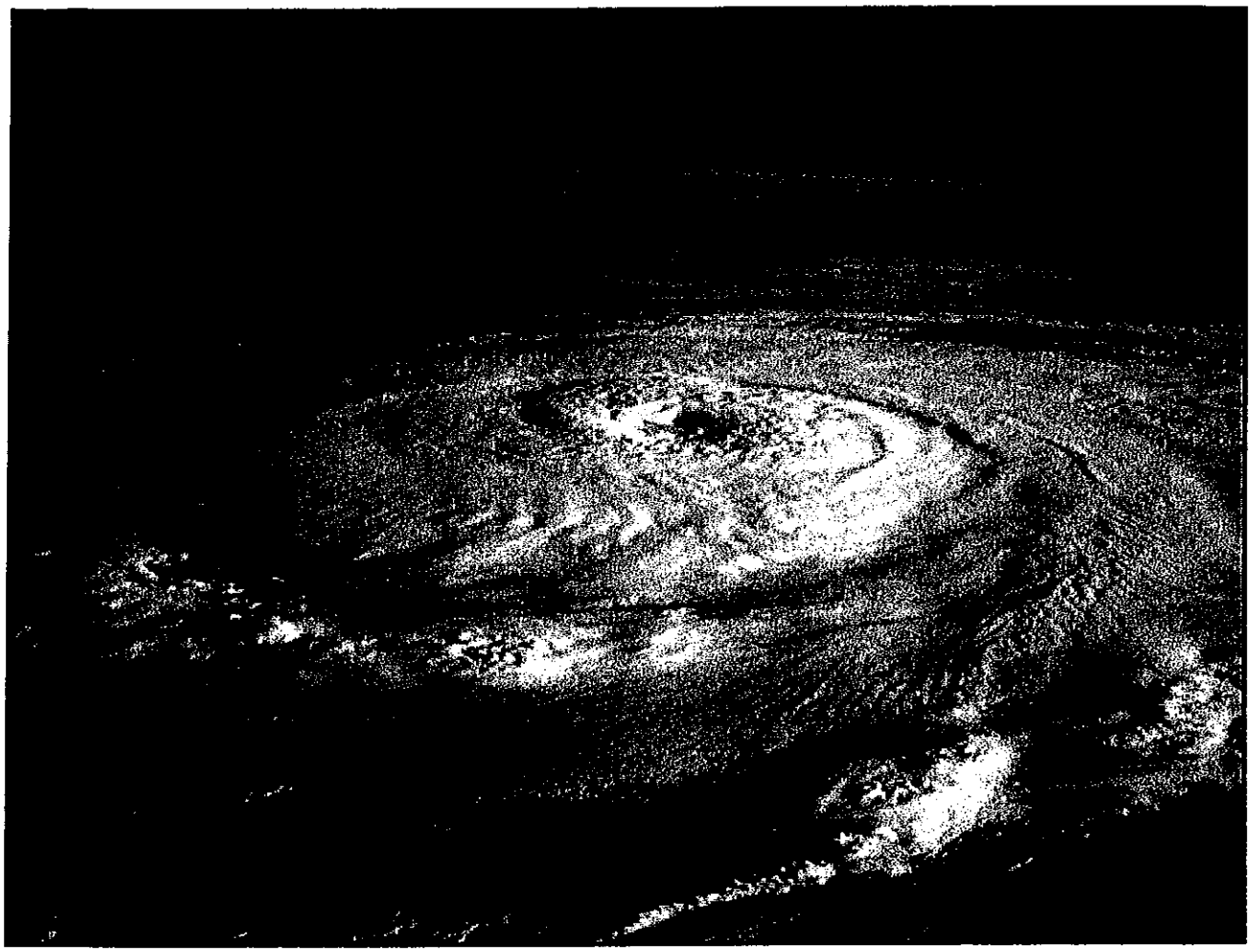
Gulf County
Local Mitigation Strategy



Planning
for a
Disaster Resistant Community

September 30, 2004

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Gulf County

Local Mitigation Strategy

EXECUTIVE SUMMARY

Gulf County is threatened by a number of different types of natural, technological, and societal or man-made hazards. These hazards endanger the health and safety of the population of the county, jeopardize its economic vitality, and imperil the quality of its environment. Because of the importance of avoiding or minimizing the vulnerabilities to these hazards, the public and private sector interests of Port St. Joe, Wewahitchka, and Gulf County have joined together to create a task force to undertake a comprehensive planning process that has culminated in the publication of this document: "The Gulf County Local Mitigation Strategy (LMS)."

This task force, entitled the Gulf County Task LMS Force, has conducted detailed studies to identify the hazards threatening the jurisdictions of Port St. Joe, Wewahitchka, and unincorporated Gulf County and to estimate the relative risks posed to the community by those hazards. This information has been used by the Task Force to assess the vulnerabilities of the facilities and jurisdictions of Gulf County to the impacts of future disasters involving those hazards. With these identified, the Task Force has worked to identify proposed projects and programs that will avoid or minimize these vulnerabilities to make the communities of Gulf County much more resistant to the impacts of future disasters.

These proposed projects and programs aimed at reducing the impacts of future disasters are termed "mitigation initiatives" in this document. Mitigation initiatives have been developed and will continue to be proposed by the Task Force for implementation whenever the resources to do so become available. It is important to note that this mitigation list is not finalized. The list of mitigation initiatives will and should evolve as projects are undertaken and completed, as future disasters affect the county and new needs are identified, and as local priorities change. As the mitigation initiatives identified in this plan are implemented, step-by-step, Gulf County will become a more "disaster resistant" community.

Periodically, the Florida Department of Community Affairs (DCA) may provide funding for counties and their municipalities to develop or enhance a comprehensive LMS. Gulf County subcontracted with the Apalachee Regional Planning Council to facilitate the LMS development process. This document details the work of the Gulf County LMS Task Force and the Apalachee Regional Planning Council over the past several months to develop the planning organization, to undertake the needed technical analyses, and to coordinate the mitigation initiatives that have been proposed by the participating jurisdictions and organizations.

The Federal Emergency Management Agency (FEMA) and Florida DCA require that this document be adopted by the governing bodies of Port St. Joe, Wewahitchka, and Gulf County. Adoption of the Gulf County LMS by the City and County Commissions will not have any legal effect on the Comprehensive Plan or any other legally binding documents. However, adoption of the LMS will give the county and its jurisdictions priority with respect to funding for disaster

recovery and hazard mitigation from state and federal sources. Through publication of this local mitigation plan, the Task Force continues to solicit the involvement of the entire community to make the people, neighborhoods, businesses, and institutions of Gulf County safer from the impacts of future disasters.

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Section One

INTRODUCTION AND PURPOSE

Hazard Mitigation Overview

Hazard mitigation is any action taken to permanently reduce or eliminate long-term risk to people and their property from the effects of hazards. Some examples of hazard mitigation include land use planning techniques that limit infrastructure in high hazard areas and programs for retrofitting existing structures to meet new building codes and standards. Ideally, a community can minimize the effects of future hazards through a mix of code enforcement, planning, and responsible development.

Every community is exposed to some level of risk from hazards. Hurricanes, tornadoes, floods, hazardous material spills, fires, and sinkholes are some of the hazards experienced by Florida communities. It is the goal of the local mitigation strategy to identify local hazards and establish a local framework to reduce the risk of those hazards.

Local Actions can Reduce Risk

Hazards cannot be eliminated, but it is possible to determine what the hazards are, where the hazards are most severe, and identify local actions that can be taken to reduce the severity of the hazard. For example, we know hurricanes are frequent in Florida, that flooding and wind damage are most severe along the coast, that low intensity storms occur more frequent than high intensity storms, and the level of coastal flooding is fairly predictable for a given magnitude of storm. Given this knowledge, local as well as state and federal laws exist to limit the type and amount of development along the coast in areas that have been identified as high risk to coastal storms (Coastal High Hazard Areas and Velocity Zones are examples). Furthermore, there are incentives to live in lower risk areas. Insurance rates and taxes are usually higher in coastal and riverine areas.

Disasters Cost the Community

Hazards have real costs to businesses and residents. Businesses in high hazard areas can suffer when damaged or isolated by storms. Residents who build in flood prone areas are subject to evacuation, damage to their homes, lower home values, and higher insurance premiums. Critical facilities such as hospitals, schools, airports, utilities and major government buildings should not be placed in high hazard areas because the function these facilities provide are too valuable to be placed in jeopardy, especially during times of disaster. And of course, community health and safety are beyond price.

Disasters Cost Local Government

Community infrastructure such as roads, drainage structures, sewer lines, electric lines, telephone lines that are built in high hazard areas are subject to frequent damage and extremely costly repair. Also, if a local government belongs to the National Flood Insurance Program and allows development in the floodplain without proper elevation and construction techniques, the federal government can withdraw the community's access to federal flood insurance for both public and private structures. Furthermore, a local government is responsible for as much as 12.5% of their local public cost of a federally declared disaster and 100% of any damage from smaller events that are not declared disasters. These costs can put a significant strain on the local government budget.

The Gulf County Context

The Gulf County Task Force has been established to make the population, neighborhoods, businesses and institutions of the community more resistant to the impacts of future disasters. The Task Force has been undertaking a comprehensive, detailed evaluation of the vulnerabilities of the community to all types of future natural, technological and societal hazards in order to identify ways to make the county more resistant to their impacts. This document reports the results of that planning process for the current planning period.

The Gulf County Local Mitigation Strategy is intended by the Task Force to serve many purposes. These include the following:

Provide a Methodical, Substantive Approach to Mitigation Planning

The approach utilized by the Gulf County Task Force relies on a step-wise application of soundly-based planning concepts in a methodical process to identify vulnerabilities to future disasters and to propose the mitigation initiatives necessary to avoid or minimize those vulnerabilities. Each step in the planning process builds upon the previous, so that there is a high level of assurance that the mitigation initiatives proposed by the participants have a valid basis for both their justification and priority for implementation. One key purpose of this plan is to document that process and to present its results to the community.

Enhance Public Awareness and Understanding

The Task Force is interested in finding ways to make the community as a whole more aware of the natural, technological, and societal hazard that threaten the public health and safety, the economic vitality of businesses, and the operational capability of important institutions. The plan identifies the hazards threatening Gulf County and provides an assessment of the relative level of risk they pose. It also details the specific vulnerabilities of the neighborhoods of Gulf County and many of the facilities that are important to the community's daily life. The plan also includes a number of proposals of ways to avoid or minimize those vulnerabilities. This information will be very helpful to

individuals that wish to understand how the community could become safer from the impacts of future disasters.

The Task Force organization also seeks to provide information and education to the public regarding ways to be more protected from the impacts of future disasters. It has been active in communicating with the public and engaging interested members of the community in the planning process. This document, and the analyses contained herein, is the principal information resource for this activity.

Create a Decision Tool for Management

The Gulf County Local Mitigation Strategy provides information needed by the managers and leaders of local government, business and industry, community associations, and other key institutions and organizations to take actions to address vulnerabilities to future disasters. It also provides proposals for specific projects and programs that are needed to eliminate or minimize those vulnerabilities.

These proposals, called "mitigation initiatives" in the plan, have been justified on the basis of their economic benefits using a uniform technical analysis, as well as prioritized for implementation using ten objective criteria. This approach is intended to provide a decision tool for the management of participating organizations and agencies regarding why the proposed mitigation initiatives should be implemented, which should be implemented first, and the economic and public welfare benefits of doing so.

Promote Compliance with State and Federal Program Requirements

There are a number of state and federal grant programs, policies, and regulations that encourage or even mandate local government to develop and maintain a comprehensive mitigation strategy. This plan is specifically intended to assist the participating local governments to comply with these requirements, and to enable them to more fully and quickly respond to state and federal funding opportunities for mitigation-related projects. Because the plan defines, justifies and prioritizes mitigation initiatives that have been formulated through a technically valid hazard analysis and vulnerability assessment process, the participating organizations are better prepared to more quickly and easily develop the necessary grant application materials for seeking state and federal funding.

Enhance Local Policies for Hazard Mitigation Capability

A component of the hazard mitigation planning process conducted by the Gulf County Task Force is the analysis of the existing policy, program and regulatory basis for control of growth and development. This process involves cataloging the current mitigation-related policies of local government so that they can be compared the hazards that threaten the jurisdiction and the relative risks they pose to the community. When the risks posed to the community by a specific hazard are not adequately addressed in the community's policy or regulatory framework, the impacts of future disasters can be even more severe. The planning process utilized by the Task Force supports detailed

comparison of the community's policy controls to the level of risk posed by specific hazards. This comparison supports and justifies efforts to propose enhancements in the policy basis for could or should be promulgated by the involved local jurisdictions to create a more disaster-resistant future for the community.

Assure Inter-Jurisdictional Coordination of Mitigation-Related Programming

A key purpose of the planning process utilized by the Gulf County Task Force is to ensure that proposals for mitigation initiatives are reviewed and coordinated among the participating jurisdictions within the County. In this way, there is a high level of confidence that mitigation initiatives proposed by one jurisdiction or participating organization, when implemented, will be compatible with the interests of adjacent jurisdictions and unlikely to duplicate or interfere with mitigation initiatives proposed by others.

Create Jurisdiction-Specific Mitigation Strategies for Implementation

A key purpose of the Gulf County Local Mitigation Strategy is to provide each participating local jurisdiction with a specific plan of action that can be adopted and implemented pursuant to its own authorities and responsibilities. Therefore, the plan addresses mitigation for each separate participating jurisdiction. Initiatives can be adopted and implemented for the jurisdiction's own purposes and on its own schedule. In this way, the format of the plan and the operational concept of the planning process ensure that proposed mitigation initiatives are coordinated and prioritized effectively among jurisdictions, while nonetheless allowing each jurisdiction to adopt only the proposed mitigation initiatives that it actually has the authority or responsibility to implement when resources are available.

Provide a Flexible Approach to the Planning Process

The planning process used by the Gulf County Task Force is very flexible in meeting the analysis and documentation needs of the planning process. The planning program utilized provides for the creation of this document, as well as the preparation of numerous other reports regarding the technical analyses undertaken. In this way, the plan assists the Task Force with utilizing a full range of information in the technical analysis and the formulation of proposed mitigation initiatives for incorporation into this plan.

The following sections of the Gulf County Local Mitigation Strategy present the detailed information to support these purposes. The remainder of the plan describes the planning organization developed by the Task Force, as well as its approach to managing the planning process. It then summarizes the results of the hazard identification and vulnerability assessment process, and addresses the current policy basis for hazard management by the participating jurisdictions and organizations. The plan also documents the structural and non-structural mitigation initiatives proposed by the participating jurisdictions to address the identified vulnerabilities. The plan concludes by addressing the goals and objectives of the Task Force for the next planning period, during which this plan will continue to be expanded and refined.

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Section Two

THE PLANNING PROCESS

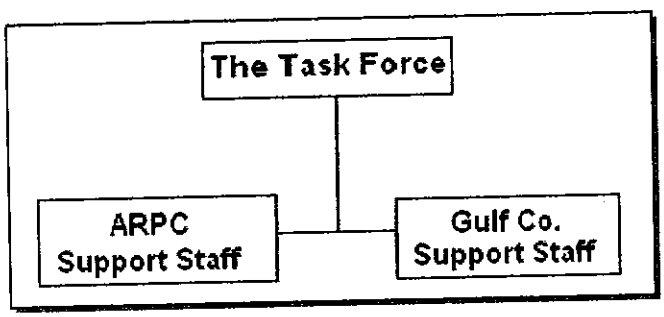
The Gulf County Task Force is made up of a number of local government agencies, business interests, community organizations, and institutions. This section describes the local jurisdictions and organizations participating in the Task Force and discusses the organizational structure used to complete the public planning process. It also explains the characteristics of the Task Force as an organization, as defined in its bylaws, and the basic procedures for conducting the planning process, which are described in the Task Force's operating procedures. Furthermore, there is a summary of the current status of planning activities by the participants.

The Task Force Organizational Structure

The Gulf County Mitigation Task Force encourages participation by all interested local jurisdictions, agencies, organizations and individuals. Broad community representation is promoted in the Task Force and at public meetings to provide ample opportunity for public commentary and consideration of the local mitigation strategy. The organization is intended to represent a partnership between the public and private sector of the community, working together to create a disaster resistant community. The proposed mitigation initiatives developed by the Task Force and listed in this plan, when implemented, are intended to make the entire community a safer from the impacts of future disasters, for the benefit of every individual, neighborhood, business, and institution.

The Task Force was organized in the following manner *(Figure 2.1)*:

Figure 2.1. The Gulf County Task Force Organizational Structure



The responsibilities and duties of this organizational structure are provided in *Appendix A: Task Force Bylaws.* The Gulf County Mitigation Task Force has adopted bylaws to establish

its purpose and responsibility, to create a structure for the organization, and to establish the other fundamental characteristics of the Task Force as a community service organization.

Although the Apalachee Regional Planning Council (ARPC) has been primarily responsible for updating the Local Mitigation Strategy, the Gulf County Task Force assists the ARPC support staff in making official decisions regarding the planning process. Most importantly for this document, however, was the Task Force's role to be responsible for approval of proposed mitigation initiatives for incorporation into the plan, for determining the priorities for implementation of those initiatives, and for removing or terminating initiatives that are no longer desirable for implementation. The Task Force also coordinates the actual technical analyses and planning activities that are fundamental to development of this plan. These activities include conducting the hazard identification and vulnerability assessment processes, as well as receiving and coordinating the mitigation initiatives for incorporation into this plan.

The Task Force represents all of the local jurisdictions and key organizations participating in the planning process. The Gulf County Task Force includes representatives from the planning and zoning department, building department, emergency management department, insurance agencies, real estate, and the general public. Members of the city and county commission, as well as, the local chamber of commerce and non-governmental organizations were also involved. Individual jurisdictions, and their agencies and local organizations, were essential to accomplishing the planning process. The only education institution in Gulf County, the Gulf and Franklin Center of Gulf Coast Community College, was invited to assist in the development of the plan.

Each public and private entity that has been contacted thus far in the planning process is listed in *Table 2.1*. Members of each organization were sent invitation letters and e-mails explaining the important of the Gulf County Local Mitigation Strategy and requesting cooperation. Sample invitation letters to the jurisdictions and several community organizations are provided in *Appendix B: Documentation of the Planning Process*. The Gulf County Mitigation Task Force benefited from the assistance and support of its many members, and *Table 2.2* listing the participating organizations is also included.

Participation in the Task Force is not limited in any manner, and all members of the community, whether representing the public or private sector, are welcome to participate. The public is encouraged to become involved with the Gulf County Local Mitigation Strategy to gauge plan effectiveness and help identify local hazards to be placed on the county project list. Participation from interested parties, including local/adjacent government representatives and citizens, is solicited via public meeting advertisements in the *Gulf County Star* newspaper (documented in *Appendix B: Documentation of the Planning Process*), and articles in the Gulf County Chamber of Commerce newsletter. Meeting dates, information, and agendas are also posted on the Apalachee Regional Planning Council website.

A copy of the draft mitigation strategies document developed by the Gulf County Mitigation Task Force will be maintained for public review and comment at the following locations: the County Emergency Management Office and the office of the Apalachee Regional Planning Council. Also, the draft document and meeting minutes are accessible at the Apalachee

Regional Planning Council website. Links to the Gulf County website are provided, along with contact and information updates to ensure that the public is aware of plan developments. Comments can be made to the Task Force and Apalachee Regional Planning Council via phone, letter, or e-mail. Public notices were placed in the *Gulf County Star* (documented in *Appendix B: Documentation of the Planning Process*) newspaper advising interested parties that the draft mitigation strategies are available for comment at the appropriate locations. Interested parties can provide comments at any time, which will be incorporated into drafts of the local mitigation strategy.

As other potential stakeholders are identified, they will be contacted and asked to join the Task Force. Gulf County will continually update its Task Force membership by providing updates at Gulf County Commission meetings. In addition, the Apalachee Regional Planning Council will continue to research prospective organizations and accept referrals from current Task Force members.

Summary of the Planning Process

The Task Force scheduled to meet four times over one year: in the initial phases of the planning process development, before completion of the hazard identification analysis, during the assessment of hazard mitigation measures, and after the completion of the draft plan. The meeting dates, respectively, are as follows:

- August 13, 2003
- November 14, 2003
- February 24, 2004
- October 7, 2004

The purpose of the last meeting is to solicit formal public comments regarding the completed plan prior to its approval by the Florida Department of Community Affairs, the Federal Emergency Management Agency, and each participating jurisdiction. The work plan schedule is provided in this section.

It is important to emphasize that the procedure used by the Gulf County Mitigation Task Force is based on the following important concepts:

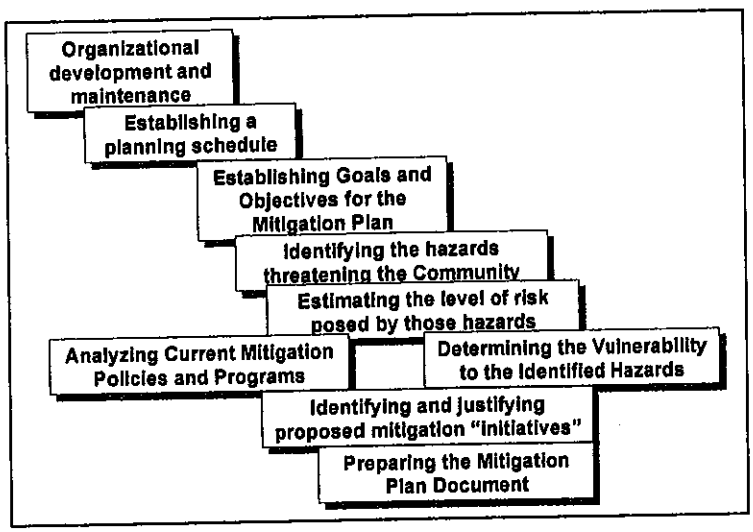
- A multi-organizational, multi-jurisdictional planning group establishes specific goals and objectives to address the community's vulnerabilities to all types of hazards.
- It utilizes a logical, stepwise process of hazard identification, risk evaluation and vulnerability assessment, as well as review of past disaster events, that is consistently applied by all participants.
- Mitigation initiatives are proposed for incorporation into the plan only by those jurisdictions or organizations with the authorities and responsibilities for their implementation.
- The process encourages participants to propose specific mitigation initiatives that are feasible to implement and clearly directed at reducing specific vulnerabilities to future disasters.

- Proposed mitigation initiatives are characterized in a substantive manner, suitable for this level of planning, to assure their cost effectiveness and technical merit, as well as coordinated among jurisdictions to assure that conflicts or duplications are avoided.

The Task Force's Operating Procedures

The planning process undertaken by the Task Force is generally described in the operating procedures of the group, which are enclosed in this section. The process described in the procedures mainly addresses how hazard mitigation initiatives are to be developed and processed using the Mitigation 20/20™ computer software support program. These procedures involve both a technical approach to the planning and an organizational methodology for incorporating mitigation initiatives into the Gulf County Local Mitigation Strategy. The general technical analysis process is that identified in *Figure 2.2*:

Figure 2.2. Gulf County Hazard Mitigation Planning Process



The planning process has been started with the development of the Task Force as an organization and obtaining participation from the local government jurisdictions and key organizations and institutions. The planning work conducted to develop this document relies heavily on the expertise and authorities of the participating agencies and organizations, rather than on detailed scientific or engineering studies. The Task Force is confident that the best judgment of the participating individuals, because of their role in the community, can achieve a level of detail in the analysis that is more than adequate for purposes of local mitigation planning. As the planning process described herein continues, more detailed and costly scientific studies of the mitigation needs of the community can be defined as initiatives for incorporation into the plan and implemented as resources become available to do so.

Establishing the planning schedule

As indicated in the exhibit, the Task Force initially establishes a planning schedule for the upcoming planning period that allows the participants to anticipate their involvement in the technical analyses and evaluations that they will be asked to do. At the outset of the planning period, the Task Force defines the goals that the planning process is attempting to achieve, as well as the specific objectives within each goal that will help to focus the planning efforts. The goals and objectives established by the Gulf County Task Force for this planning period are described in *Section 5: Mitigation Goals and Policies*.

Conducting the needed analyses and then formulating proposed mitigation initiatives to avoid or minimize vulnerability of the community to future disasters is an enormous effort, and one that must take place over a long period of time. Therefore, for any one planning period, the goals and objectives set by the Task Force are intended to help focus the effort of the participants, for example, by directing attention to certain types of facilities or neighborhoods, or by emphasizing implementation of selected types of proposed mitigation initiatives.

Hazard Identification and Risk Estimation

The Task Force then identifies the natural, technological, and societal hazards that threaten all or portions of the community. Where possible, specific geographic areas subject to the impacts of the identified hazards are delineated. The Task Force also uses general information to estimate the relative risk of the various hazards as an additional method to focus their analysis and planning efforts. The Task Force compares the likelihood or probability that a hazard will impact an area, as well as the consequences of that impact to public health and safety, property, the economy, and the environment. This comparison of the consequences of an event with its probability of occurrence is a measure of the risk posed by that hazard to the community. The Task Force compares the estimated relative risks of the different hazards it has identified to highlight which hazards should be of greatest concern during the upcoming mitigation planning process.

Depending on the participating jurisdiction, a variety of information resources regarding hazard identification and risk estimation have been available. The planners representing the jurisdiction have attempted to incorporate consideration of hazard specific maps, including flood plain delineation maps, whenever applicable, and have attempted to avail themselves of GIS-based analyses of hazard areas and the locations of critical facilities, infrastructure components and other properties located within the defined hazard areas.

Estimating the relative risk of different hazards is followed by the assessment of the vulnerabilities in the likely areas of impact to the types of physical or operational agents potentially resulting from a hazard event. Two methods are available to the Task Force to assess the communities' vulnerabilities to future disasters.

Vulnerability Assessment

The first avenue is a methodical, qualitative examination of the vulnerabilities of important facilities, systems and neighborhoods to the impacts of future disasters. For the participating jurisdictions and organizations, this is done by the individuals most familiar with the facility, system or neighborhood through a guided, objective assessment process established by the Mitigation 20/20™ computer software. The process ranks both the hazards to which the facility, system or neighborhood is most vulnerable, as well as the consequences to the community should it be disrupted or damaged by a disaster. This process typically results in identification of specific vulnerabilities that can be addressed by specific mitigation initiatives that can be proposed and incorporated into this plan. As an associated process, the Task Force also reviews past experiences with disasters to see if those events highlighted the need for specific mitigation initiatives based on the type or location of damage they caused. Again, these experiences can result in the formulation and characterization of specific mitigation initiatives for incorporation into the plan.

The second avenue for assessment of community vulnerabilities, as illustrated in the exhibit, involves comparison of the existing policy, program and regulatory framework promulgated by local jurisdictions to control growth, development and facility operations in a manner that minimizes vulnerability to future disasters. The Task Force members can assess the individual jurisdictions' existing codes, plans, and programs to compare their provisions and requirements against the hazards posing the greatest risk to that community. If indicated, the participating jurisdiction can then propose development of additional codes, plans or policies as mitigation initiatives for incorporation into the Gulf County Local Mitigation Strategy for future implementation when it is appropriate to do so. The Task Force consulted the following documents:

- Gulf County Floodplain Ordinance
- Gulf County Comprehensive Emergency Management Plan
- Gulf County Comprehensive Plan
- Port St. Joe Comprehensive Plan
- City of Wewahitchka Comprehensive Plan
- Apalachee Regional Planning Council Strategic Regional Policy Plan
- Northwest Water Management District Plan
- State Comprehensive Plan
- State Hazard Mitigation Plan
- Community Ranking System (CRS) and Flood Mitigation Assistance (FMA) plans

Several of these plans are currently being updated. However, the updated plans were not available when the Gulf County Local Mitigation Strategy was completed.

Developing Hazard Mitigation Initiatives

This process enables the Task Force participants to highlight the most significant vulnerabilities, again to assist in prioritizing subsequent efforts to formulate and characterize specific hazard mitigation initiatives to eliminate or minimize those vulnerabilities. Once the highest priorities are defined, the Task Force participants can identify specific mitigation initiatives for the plan that would eliminate or minimize those vulnerabilities.

The Mitigation 20/20™ computer software program establishes a methodical, objective procedure for characterizing and justifying the mitigation initiative proposed by each participating jurisdiction for incorporation into this plan. This procedure involves describing the initiative, relating it to one of the goals and objectives established by the Task Force, and justifying its implementation on the basis of its economic benefits and/or protection of public health and safety, as well as valuable or irreplaceable resources. A "benefit to cost" ratio is established for each initiative to demonstrate that it would indeed be worthwhile to implement when or if the resources to do so became available. Further, each proposed mitigation initiative is "prioritized" for implementation in a consistent manner by each participating organization using a set of ten objective criteria.

In characterizing a mitigation initiative for incorporation into the Task Force's plan, it is important to recognize that the level of analysis conducted by each organization involved has been intentionally designed to be appropriate for this stage in the planning process. That is, it is the interest of the Task Force to have a satisfactory level of confidence that a proposed mitigation initiative, when it is implemented, will be cost effective, feasible to implement, acceptable to the community, and technically effective in its purpose. To do this, the technical analyses conducted, including the development of a benefit to cost ratio for each proposal, have been based on a straightforward, streamlined approach, relying largely on the informed judgment of experienced local officials. The analyses have not been specifically designed to meet the known or anticipated requirements of any state or federal funding agency, due largely to the fact that such requirements can vary with the agency and type of proposal. Therefore, at the point when the organization proposing the initiative is applying for funding from any state or federal agency, or from any other public or private funding source, that organization will then address the specific informational or analytical requirements of the funding agency.

Each mitigation initiative proposed for incorporation into the plan is formulated and submitted to the Task Force for consideration by an agency, organization, business, or individual that has the authority or responsibility for its implementation. This avoids the artificiality of proposing mitigation initiatives when it is unclear who would implement them and if the authority to do so is actually available.

Developing the Local Mitigation Plan

Once the above procedure is completed by the agency or organization developing the proposed mitigation initiative, the information used to characterize the initiative is submitted to the Task Force for review and inter-jurisdictional coordination.

On receipt of a pending initiative, the Task Force first evaluates the merits of the proposal and the validity of the judgments and assumptions that went into its characterization, as well as considers its potential for conflict with other jurisdiction's programs or interests. The Task Force also assures that the proposal is consistent with the goals and objectives established for the planning period and confirms that it would not duplicate or harm a proposal submitted by another jurisdiction or agency. If there is such a difficulty with a proposed initiative, it is returned to the submitting organization for revision or reconsideration.

Once the Task Force has reviewed and coordinated the submitted initiative, and is satisfied regarding its merit, it is formally considered for incorporation into the Gulf County Local Mitigation Strategy. The Task Force again can assure that the proposed initiative is consistent with the goals and objectives for the planning period and would be beneficial for the community as a whole if and when implemented. If so, the Task Force then informally votes to incorporate the proposed initiative into the strategy.

During routine updates of the Gulf County Local Mitigation Strategy, each mitigation initiative included in the plan is evaluated to determine if it is still valid or should be removed from the plan, or whether its implementation should be a priority or deferred until a later time.

Approval of the Current Edition of the Plan

At the end of each planning period, a plan document such as this is prepared for release to the community and for action by the governing bodies of the jurisdictions and organizations that participated in the planning process.

Implementation of Approved Mitigation Initiatives

Once incorporated into the Gulf County Local Mitigation Strategy, the agency or organization proposing the initiative becomes responsible for its implementation. This may mean developing a budget for the effort, or making application to state and federal agencies for financial support for implementation. This is the approach utilized by the Gulf County Task Force because only the jurisdiction or organization itself has the authorities or responsibilities to implement its proposed mitigation initiatives.

Current Status of Participation in the Task Force

In order to support the participating jurisdictions in the completion of the community profiles and vulnerability assessments, the Task Force sets a schedule for each technical analysis step, provides training in the evaluations needed, and distributes the necessary forms for completion. The jurisdictions then complete the assignments and return the forms to the Task Force. The information provided on these forms is then used to create this plan.

Each public meeting was conducted as a workshop for the Task Force. During the first meeting, the Task Force acquainted themselves with the planning process and identified out-of-date information in the 1999 Gulf County Local Mitigation Strategy. At the second public meeting, the Task Force completed a hazard identification and risk estimation matrix and

updated the recent events analysis. In addition, the Apalachee Regional Planning Council provided mitigation goals worksheets to the Task Force. After scoring goals according to mitigation priority, the Task Force returned the sheets to the Apalachee Regional Planning Council to be compiled. For the third meeting, the Task Force assessed previous mitigation activities, recommended new initiatives, and evaluated the mitigation measures.

To date, the Gulf County Assistant Planner has completed profiles detailing the jurisdictions' characteristics, current/future land use, and development trends. A list of repetitive lost properties and critical facilities inventory was provided by Gulf County to the Apalachee Regional Planning Council support staff for analysis in the vulnerability assessments.

Once the participating jurisdictions submitted their individual analyses, the support staff entered the information provided in the Mitigation 20/20™ computer software program. This program helped to guide the activities of the Task Force, record and manage the information generated, and to produce this document. The support staff serving the Task Force is from the Gulf County and the Apalachee Regional Planning Council. These staff members facilitated the work of the Task Force by preparing agendas, notifying the Task Force of upcoming meetings, and processing meeting products. Moreover, they were responsible for the preparation of this plan.

The participating jurisdictions, organizations, and individuals in the Gulf County Mitigation Task Force have all worked diligently to complete this plan, and will continue to do so in the future to create a truly disaster resistant community for the benefit of all its citizens.

Table 2.1. Organizations Invited to Participate, by Jurisdiction

Jurisdiction	
Organization	Membership Type
Gulf County (Unincorporated)	
American Red Cross	Volunteer Organization
Federal Alliance of Safe Homes	Non-Profit
Florida Department of Community Affairs	State
Gulf Coast Community College-Franklin and Gulf Ctr	Institution
Gulf County Board of County Commissioners	County
Gulf County Chamber of Commerce	Business
Gulf County Clerk of Court	County
Gulf County Emergency Management	County
Gulf County Emergency Medical Services	County
Gulf County Extension Service	County
Gulf County GIS	County
Gulf County Health	County
Gulf County Mosquito Control and Solid Waste	County
Gulf County Planning and Building	County
Gulf County Property Appraiser	County
Gulf County Public Works	County
Gulf County Road	County
Gulf County Tourist Development Council	Business
Gulf County Veterans' Service	County
Mexico Beach Community Development Council	Community Association
Salvation Army	County
Port St. Joe	
City of Port St. Joe	Municipality
Costin Insurance Agency	Business
Hannon Insurance Company	Business
IBS	Business

South Gulf County Taxpayers Association	Neighborhood Association
State Farm Insurance	Business
Wewahitchka	
City of Wewahitchka	Municipality
Gaskin-Graddy Insurance	Business

Table 2.2. Member Organizations, by Jurisdiction

Jurisdiction	
Organization	Membership Type
Gulf County (Unincorporated)	
American Red Cross	Volunteer Organization
Apalachee Regional Planning Council	Regional
Gulf County Chamber of Commerce	Business
Gulf County Emergency Management	County
Gulf County GIS	County
Gulf County Health Department	County
Gulf County Planning and Building	County
Gulf County Road	County
Gulf County Veterans' Service Office	County
Port St. Joe	
City of Port St. Joe	Municipality
Wewahitchka	
City of Wewahitchka	Municipality

Table 2.3. Task Force Work Plan

Development of Planning Process (July – September 2003)

- **Project Initiation and Public Meeting #1: August 13, 2003**
- Revise LMS Planning Process
- Review current LMS plan

Hazard Identification, Analysis, and Risk Assessment (October 2003 – January 2004)

- Hazard Identification
- Hazard Events Analysis
- Jurisdiction Profile (Community Asset Inventory)
- Vulnerability Assessment
- Risk Assessment/Loss Estimation
- **Public meeting #2: November 14, 2003**

Assessment of Hazard Mitigation Measures and Needs (February 2003 – May 2004)

- Plans, Policies, and Programs Examination
- Develop of Mitigation Goals
- Assessment of Previous Mitigation Activities
- Identification of Resources
- Research of Mitigation Alternatives
- Evaluate the Mitigation Measures
- Mitigation Recommendations
- Mitigation Action Plan
- **Public Meeting #3: February 24, 2004**

Production of Final Plan (June – October 2004)

- Draft Plan
- **Final Presentation and Public Meeting #4: October 7, 2004**
- Final Plan
- Adoption of plan by the County and municipalities

Gulf County

Local Mitigation Strategy

Section Three

JURISDICTION PROFILES

This section of the plan contains information about each individual jurisdiction of Gulf County: Port St. Joe, Wewahitchka, and the unincorporated areas. Local agencies and organizations serving each jurisdiction developed the profiles of Port St. Joe, Wewahitchka, and Gulf County's unincorporated areas. The approach of the Gulf County Task Force was to catalogue the results of the planning effort by jurisdiction, in order to provide information and analysis that will support the jurisdiction's efforts to implement their priority mitigation initiatives. In addition, the jurisdiction profiles created a "baseline" or starting point for the Task Force to identify potential vulnerabilities to future disasters and to initially indicate avenues for pursuing evaluations and assessments throughout Gulf County as the planning process continues in the future.

This profile includes information regarding the demographic and infrastructure characteristics of each jurisdiction, a list of plans and codes governing the jurisdiction, and a general description of land uses and development trends. All demographic data was obtained from the United States Census Bureau 1999 estimates, 2000 census, and 2002 estimates. The Gulf County Planner provided all other information.

There may be differences among the amount of information or analysis provided for each jurisdiction. This may be a result of the differing characteristics of the jurisdictions, the information and data available to use in the analysis, and the time available for the jurisdiction's representatives to conduct the planning process.

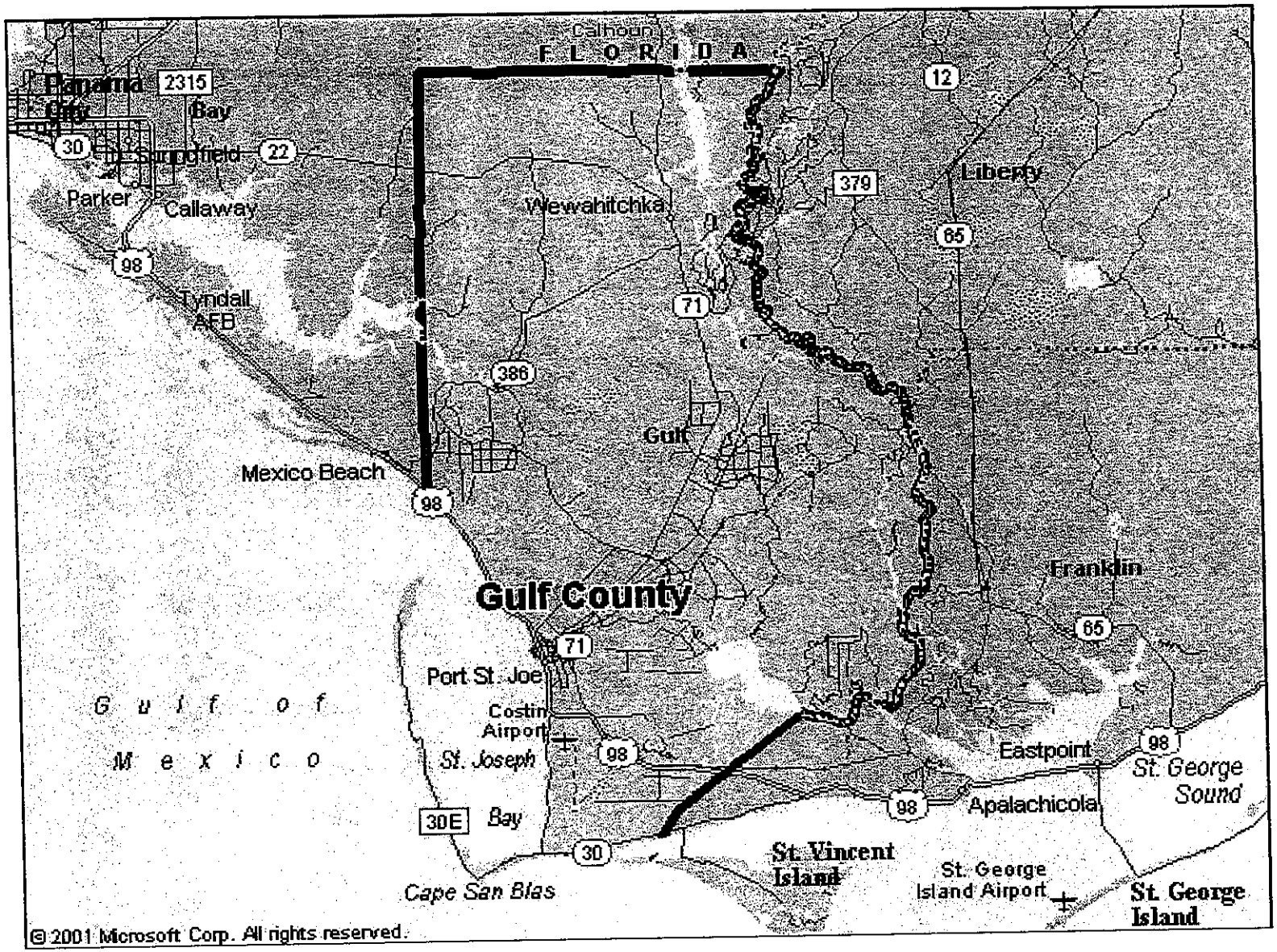


Figure 3.1. Gulf County, Florida
Source: http://www.aaafloridadirectories.com/Gulf.htm

Gulf County (unincorporated areas)

Estimated current population, 2002: 14,789

Estimated geographic size, 2000: 555 square miles Persons per square mile, 2000: 24.0

Current growth trend: Increasing slightly (10.2% population increase since 2000)

Principal economic base for jurisdiction: State government (prison system)

Other key economic industries: Public administration, Retail and commercial, Healthcare

Economic characterization of the jurisdiction as a whole: Average for the state

- Median household income, 1999: $30,276
- Per capita money income, 1999: $14,449
- Persons below poverty, 1999: 16.7%
- Gulf County has received the special designation as the Governor's Area of Critical Concern due to the economic status of its residents.

The jurisdiction has completed the following:

1. A comprehensive land use plan
2. A land use code and zoning ordinance
3. A building code—2001 Florida Building Code
4. A fire and life safety code
5. Insurance Service Office Public Protection Classification rating of the fire departments within the jurisdiction: 10
6. Current Building Code Effectiveness Classification for the jurisdiction: 8
7. Participant in the National Flood Insurance Program (NFIP)
8. Current NFIP Community Ranking System (CRS): 9

Table 3.1. Gulf County Current Land Uses, 2004

Current Land Use Categories	Percent of Jurisdiction Included
Agricultural	79.45%
Commercial	--
Developed mixed uses	1.62%
Industrial	0.10%
Institutional (education, health care, etc.)	--
Parks/restricted wild land/wildlife refuge	0.25%
Residential	3.98%
Transportation or utility right-of-way	--
Vacant/unused - government ownership	0.36%
Vacant/unused – private ownership	--
Waterway/lake/wetland	14.24%

Table 3.2. Gulf County Future Land Uses, 2004

Planning year for future land use projection: 2004 (Gulf County will rewrite its comprehensive plan in the near future)

Current Land Use Categories	Percent of Jurisdiction Included
Agricultural	79.45%
Commercial	--
Developed mixed uses	1.62%
Industrial	0.10%
Institutional (education, health care, etc.)	--
Parks/restricted wild land/wildlife refuge	0.25%
Residential	3.98%
Transportation or utility right-of-way	--
Vacant/unused - government ownership	0.36%
Vacant/unused – private ownership	--
Waterway/lake/wetland	14.24%

Development trends for the jurisdiction:

Gulf County's unincorporated areas are not considered to be fully developed. Development of vacant and unused land is occurring very rapidly or much faster than planned. Expansion, redevelopment, and reconstruction of existing properties are numerous properties in many locations. Potential development will face hazards identical to those having a great affect on all of unincorporated Gulf County: flooding, storm surge, wildfire, and landslide.

Development, expansion, redevelopment or reconstruction is currently controlled by:

- A building code
- A land use plan
- A zoning code
- Flood hazard specific ordinance

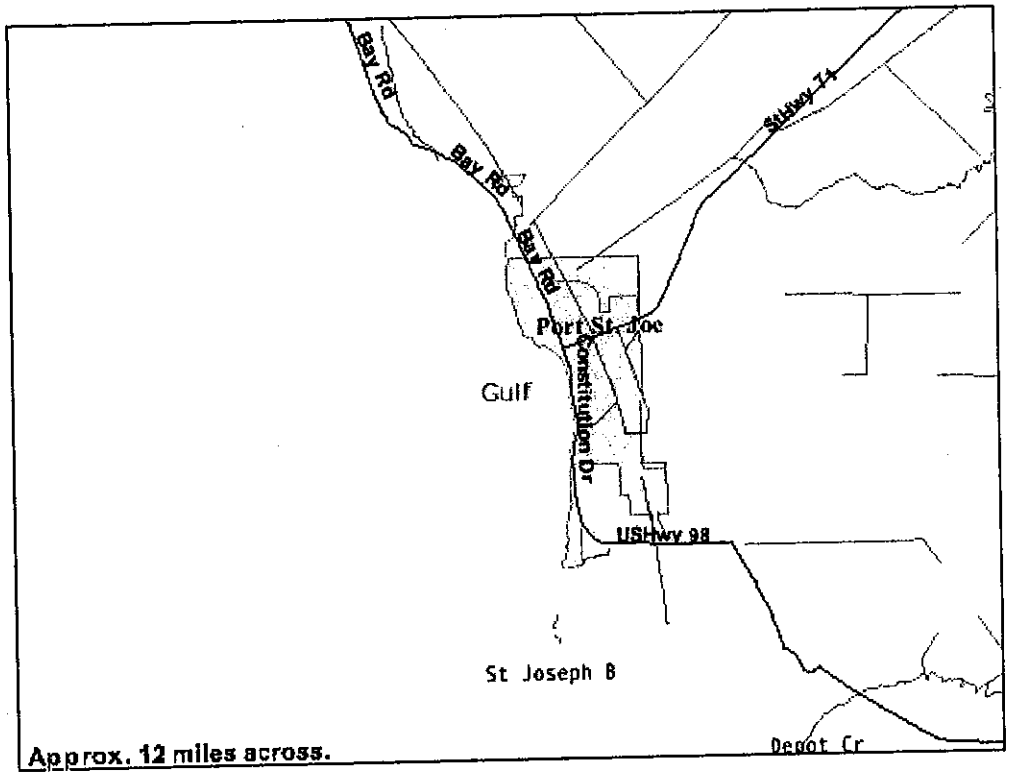


Figure 3.2. Port St. Joe, Florida
Source: U.S. Census.

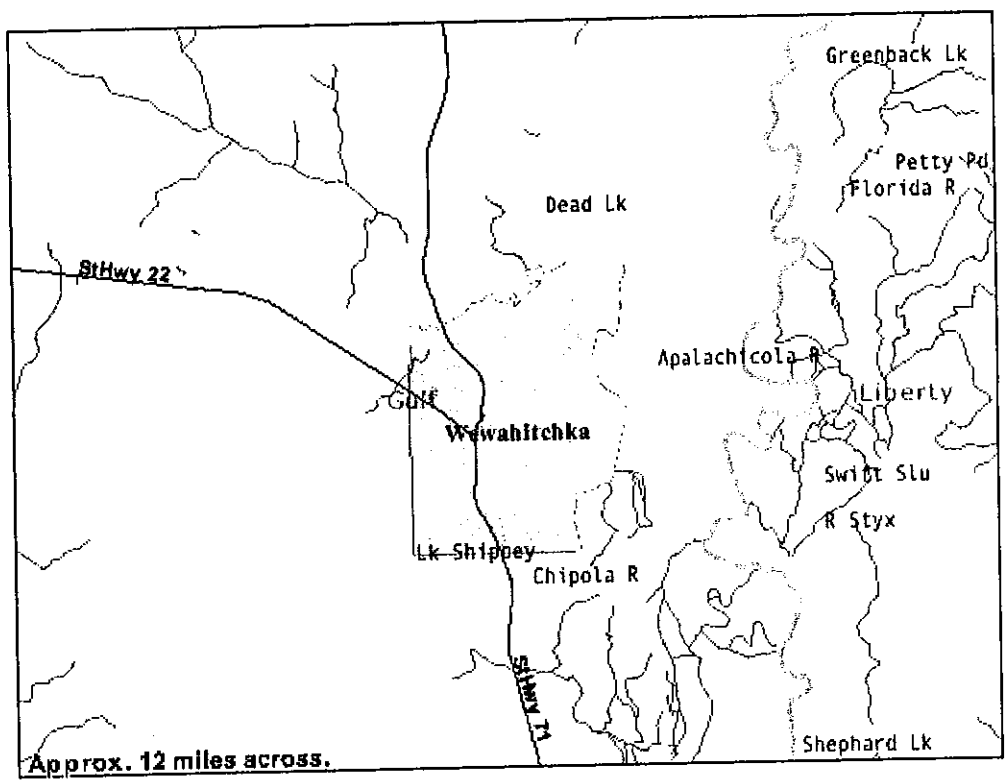


Figure 3.3. Wewahitchka, Florida
Source: U.S. Census.

Port St. Joe

Estimated current population: 2,334

Estimated geographic size: 4.81 square miles

Current growth trend: Declining slightly

Principal economic base for jurisdiction: Fishing

Other key economic industries: Public administration, Retail and commercial

Economic characterization of the jurisdiction as a whole: Average for the state

- Median household income, 1999: $23,750
- Per capita money income, 1999: $14,677
- Persons below poverty, 1999: 14.8%

The jurisdiction has completed the following:

1. A comprehensive land use plan
2. A land use code and zoning ordinance
3. A building code—2001 Florida Building Code
4. A fire and life safety code
5. Insurance Service Office Public Protection Classification rating of the fire departments within the jurisdiction: 6
6. Participant in the National Flood Insurance Program (NFIP)
7. Current NFIP Community Ranking System (CRS): 9

Table 3.3. Port St. Joe Current Land Uses, 2004

Current Land Use Categories	Percent of Jurisdiction Included
Agricultural	--
Commercial	10%
Developed mixed uses	--
Industrial	30%
Institutional (education, health care, etc.)	5%
Parks/restricted wild land/wildlife refuge	5%
Residential	48%
Transportation or utility right-of-way	--
Vacant/unused - government ownership	--
Vacant/unused – private ownership	--
Waterway/lake/wetland	2%

Table 3.4. Port St. Joe Future Land Uses, 2010

Planning year for future land use projection: 2010

Current Land Use Categories	Percent of Jurisdiction Included
Agricultural	--
Commercial	10%
Developed mixed uses	--
Industrial	30%
Institutional (education, health care, etc.)	5%
Parks/restricted wild land/wildlife refuge	5%
Residential	48%
Transportation or utility right-of-way	--
Vacant/unused - government ownership	--
Vacant/unused – private ownership	--
Waterway/lake/wetland	2%

Development trends for the jurisdiction:

Port St. Joe is not considered to be fully developed. Approximately 90% of the jurisdiction is still open for development. Development of vacant and unused land is occurring rapidly or somewhat faster than planned. Expansion, redevelopment, and reconstruction of existing properties is occurring to very few or no properties. Potential development will face hazards identical to those having a great affect on all of Port St. Joe: flooding, storm surge, wildfire, and landslide.

Development, expansion, redevelopment or reconstruction is currently controlled by:

- A building code
- A land use plan
- A zoning code
- Flood hazard specific ordinance

Wewahitchka

Estimated current population: 1,303

Estimated geographic size: 2.66 square miles

Current growth trend: Declining slightly

Principal economic base for jurisdiction: Fishing

Other key economic industries: Public administration, Retail and commercial

Economic characterization of the jurisdiction as a whole: Average for the state

- Median household income, 1999: $23,073
- Per capita money income, 1999: $12,227
- Persons below poverty, 1999: 19.9%

The jurisdiction has completed the following:

8. A comprehensive land use plan
9. A land use code and zoning ordinance
10. A building code—Gulf County Building Code
11. Insurance Service Office Public Protection Classification rating of the fire departments within the jurisdiction: 7
12. Participant in the National Flood Insurance Program (NFIP)
13. Not a participant in the NFIP Community Ranking System (CRS)

Table 3.5. Wewahitchka Current Land Uses, 2004

Current Land Use Categories	Percent of Jurisdiction Included
Agricultural	55%
Commercial	7%
Developed mixed uses	6%
Industrial	--
Institutional (education, health care, etc.)	--
Parks/restricted wild land/wildlife refuge	1%
Residential	41%
Transportation or utility right-of-way	--
Vacant/unused - government ownership	--
Vacant/unused – private ownership	--
Waterway/lake/wetland	--

Table 3.6. Wewahitchka Future Land Uses, 2006

Planning year for future land use projection: 2006

Current Land Use Categories	Percent of Jurisdiction Included
Agricultural	52%
Commercial	1%
Developed mixed uses	3%
Industrial	--
Institutional (education, health care, etc.)	--
Parks/restricted wild land/wildlife refuge	1%
Residential	43%
Transportation or utility right-of-way	--
Vacant/unused - government ownership	--
Vacant/unused – private ownership	--
Waterway/lake/wetland	--

Development trends for the jurisdiction:

Wewahitchka is not considered to be fully developed. Approximately 80% of the jurisdiction is still open for development. Little or no development is occurring. Expansion, redevelopment, or reconstruction of existing properties is occurring to very few or no properties. Potential development will face hazards identical to those having a great affect on all of unincorporated Wewahitchka: flooding, storm surge, wildfire, and landslide.

Development, expansion, redevelopment or reconstruction is currently controlled by:

- A building code
- A land use plan
- Flood hazard specific ordinance

Gulf County

Local Mitigation Strategy

Section Four

HAZARDS AND VULNERABILITIES

This section of the Gulf County Local Mitigation Strategy details the results of the hazard identification and vulnerability assessment processes undertaken by the Task Force members. The intent of the section is to provide a compilation of the information gathered and the judgments made about the hazards threatening Gulf County as a whole and the potential vulnerability to those hazards. Hazards specific to each jurisdiction are also discussed along with information relevant to the entire planning area. Following the discussion of hazards facing the county is a brief evaluation of the critical facilities in the county that are at greatest risk from some of these hazards and a listing of the properties in the county that have suffered repetitive losses from past disasters. An overview of the analyses is provided.

Recent Disaster History

When a disaster strikes that overwhelms the ability of local communities to respond, the President of the United States can declare the affected communities a federal disaster area. This enables local communities to receive federal disaster assistance. Disaster assistance includes public assistance for disaster related losses to local governments, family and individual assistance, low interest loans to businesses to cope with lost revenues during the rebuilding process, and hazard mitigation grants to help fund projects to reduce local vulnerability to future disasters. *Table 4.1* lists the major disasters that have occurred recently in Gulf County. Previous occurrences (i.e. historical events) are documented for the following hazards: drought, flooding, tornadoes, hurricanes, landslide/erosion, and wildfire. **For the remaining hazards, there is no record of historical events.**

Table 4.1. Recent Disasters in Gulf County

Declaration	Date	Event	Primary Damage
#756	Nov-85	Hurricane Kate	Coastal flooding, erosion, wind damage, debris
#862	1990	Flood	Riverine flooding
#982	1993	Winter storm	Riverine flooding
#1035	Jul-94	TS Alberto	Riverine flooding
	1995	Hurricane Allison	Coastal flooding, erosion, debris
#1069	Oct-95	Hurricane Opal	Coastal flooding, erosion, and debris
#1195	Jan-98	El Niño flood	Riverine flooding
	Feb-98	Multiple	Tornadoes, riverine flooding
	Mar-98	Multiple	Tornadoes, riverine flooding
#1223	Jun-98	Wildfires	Fire damage
#1223	Jul-98	Drought	Crop damage, severe heat
#1198	Sep-98	Hurricane Earl	Coastal flooding, erosion, wind damage, debris
#1249	Sep-98	Hurricane Georges	Coastal flooding, erosion, and debris
#3139	Apr-99	Fire, drought	Fire damage, crop damage, severe heat
	Jun-00	Drought	Crop damage, severe heat
#1344	Oct-00	TS Helene	Riverine flooding
	Sep-02	Hurricane Isidore	Coastal flooding, debris
#1339	Aug-04	TS Bonnie/ Hurricane Charlie	Coastal flooding, wind damage, debris
	Aug-04	Hurricane Frances	Coastal flooding, wind damage, debris
	Sep-04	Hurricane Ivan	Coastal flooding, erosion, wind damage, debris
	Sep-04	Hurricane Jeanne	Coastal flooding, wind damage, debris

Source: Florida Division of Emergency Management, Bureau of Recovery and Mitigation.
http://www.floridadisaster.org/BRM/Disasters/Disaster_history.htm

As evidenced by the information in the preceding table, over the last 20 years, Gulf County has been affected by an incredible array of disasters. Although most of these disaster declarations have been the result of severe tropical weather, the County is vulnerable to a wide variety of hazards that are described on the following pages.

Hazard Identification and Vulnerability Assessment Overview

As noted in *Section 2: The Planning Process*, the technical planning process begins with hazard identification. In this process, the support staff and representatives of individual jurisdictions identify all of the natural, technological, and societal or man-made hazards that could threaten the community.

Hazard identification and risk estimation can be a highly complex, time consuming, and very costly effort if sophisticated technical and engineering studies are undertaken. The Mitigation 20/20™ program anticipates that most communities will not have the resources to undertake hazard identification and risk assessment studies to this level of detail. However, in order to complete the Gulf County Local Mitigation Strategy, it is necessary to have a general understanding of the hazards threatening the county and its jurisdictions, and to estimate the level of risk to the community posed by these hazards.

Representatives of the above noted disciplines could gather in a single workshop facilitated by the Gulf County Task Force. The hazards threatening the entire county would be identified and their risk estimated by the entire group, addressing each participating jurisdiction one-by-one until all had been assessed. The results of the judgments reached by this approach would be recorded on the hazard identification and risk estimation matrix provided by Mitigation 20/20™. *Table 4.32* shows the completed form for Gulf County. **There were no deviations for Port St. Joe and Wewahitchka.**

When the hazard types are identified, the participants can make an estimate of the risk each poses to the jurisdiction being evaluated. The estimate of risk is based on the judgment of the planners regarding the likely frequency of occurrence of the hazard event compared to its consequences. The higher the frequency of occurrence and the greater the consequences, the higher the risk posed by that hazard. The Task Force derives a "relative risk score" using a qualitative process in which planners compile their estimates of the likely frequency of occurrence, the extent of the community that would be impacted, and the likely consequences in terms of public safety, property damage, economic impacts and harm to valuable environmental resources. The total of the qualitative assessments of each of these is considered in this plan to constitute the "relative risk score."

In deriving these estimates of risk, the participating jurisdictions have utilized any available information regarding the geographic areas that may be impacted by each identified hazard, as well as population, infrastructure and facilities within those impacted areas. This has included inventories of valuable environmental resources, as well as factors that are influential to the economic well being of the community. Examples of such existing information resources that have been accessed in this manner include existing hazard area maps, such as Flood Insurance Rate Maps, Hurricane/Tsunami surge zone maps, tornado and severe weather frequency distribution maps, geologic hazard and soil characteristics maps, wildfire risk maps, hazardous materials accident scenarios, and similar types of hazard zone delineation maps. For many of the participating jurisdictions, this information has been available in a GIS database, or has been accessed from internet websites and state geographic and meteorological existing GIS databases.

Information regarding the existing population and property at risk within these hazard zones has been obtained, where possible, from US census data, from the property appraisal records of the participating jurisdictions, aerial photographs, topographic maps, and similar information sources. Evaluations of the potential risk to valuable environmental resources in the impacted areas have been derived from review of available environmental inventories, maps of parklands, wildlife refuges, wetlands, potable water supplies, and other similar natural features. Information on the potential risk to the economic well being of the community, particularly regarding indirect economic costs of potential hazard events, has been derived from evaluating the number of businesses that may be affected by the event, the number of jobs involved, and the revenue these businesses return to the community.

However, it must be emphasized that in many cases, detailed information regarding the areas potentially impacted by a specific hazard, as well as its potential health and safety, property, environmental and economic impacts of that hazard, has not been available. Further, it has not been the intent of the Mitigation Task Force, nor have funding resources been available, to conduct extensive new studies to obtain such information solely for the purposes of the development of this mitigation plan. Therefore, it has often been necessary to rely on the informed judgment of knowledgeable local officials in deriving these estimates. The Task Force believes that their experience with their own communities, as well as their capabilities to derive reasonable estimates of the geographic area at risk and the potential impacts of the hazard, is adequate for the purposes of this planning effort. Where the absence of hazard and risk-related data has been deemed by the jurisdiction to be a significant limitation on the effectiveness of this planning process, a proposed mitigation initiative to request funding to develop such data has been incorporated into the mitigation plan by the involved jurisdiction.

For Gulf County, the results of this process are described below and divided into two sections. The first part provides a narrative discussion of the relative risk posed by various hazard categories to the jurisdictions that were evaluated. The second section is *Table 4.22,* which summarizes of the relative risk for Gulf County for each of the public safety, property damage, economic impact, and environmental damage criteria. *Table 4.23* organizes the hazards according to relative risk scores.

Vulnerability Assessments

The Gulf County Task Force also conducted numerous vulnerability assessments during the planning period. These assessments build on the identification of hazards in the community and the risk that the hazards pose to the community. The vulnerability assessment process examines more specifically how the facilities, systems and neighborhoods of Gulf County would be damaged or disrupted by the hazard events identified during the earlier work of the Task Force participants.

The vulnerability assessment process for the Task Force begins with profiling the communities of Gulf County and examining specific characteristics that contribute to the vulnerability of the structures, people, and functioning of that specific component of the community. The assessment conducted by the Task Force includes determining the potential cost for property damage as a measure of vulnerability.

A report is enclosed in this section that assesses the jurisdictions for the presence of what is termed "critical facilities," which are structures whose function is very important to the safety and welfare of the community. The presence of critical facilities in a jurisdiction increases the importance of mitigating the potential for future disaster impacts in such area. This report also includes identification of any repetitive loss properties located in the jurisdictions assessed.

MEMPHIS Hazard Model Analysis

The Florida Department of Community Affairs has provided the Mapping for Emergency Management, Parallel Hazard Information System (MEMPHIS) to model the hazards of every county in Florida. MEMPHIS uses geographical information system technology (GIS) to estimate the potential damage and dollar losses resulting from a variety of natural hazards. The MEMPHIS coastal hazard model combined with a geographical representation of Gulf County tax assessment records allows MEMPHIS to estimate damage to all structures on record and their contents, depending on the severity of the hazard event. There is virtually no end to the types of analyses that can be generated using MEMPHIS. It must be noted that the MEMPHIS model is based upon the tracks of 40,000 simulated storms and the data were gathered so as to produce a true worst-case scenario for use in planning. Therefore, the following information is reflective of a true worst-case scenario. It is also important to be aware that MEMPHIS is limited in its ability to account for inland riverine flooding. Finally, the tax assessor and property appraiser data used by the MEMPHIS model does not distinguish between woodframe structures and concrete block structures. Therefore, the model assumes that all structures are woodframe. This will have the effect of inflating damage estimations produced by the model.

The following subsections provide explanations of the hazards present in Gulf County and its participating jurisdictions. A narrative summary of each hazard is provided which includes a definition of the hazard, a hazard map for the planning area generated by MEMPHIS, comments from the Task Force regarding how the hazard affects Gulf County, the hazard score, and the potential dollar losses generated by MEMPHIS. **No potential dollar losses were generated for technological and societal hazards.**

Dam/Levee Failure

Definition: A dam or levee is a barrier that is constructed to contain the flow of water or keep out the sea.[1] The benefits of dams are numerous: they provide water for drinking, navigation, and agricultural irrigation. Dams also provide hydroelectric power and create lakes for fishing and recreation. Most important, dams save lives by preventing or reducing floods. In the event of a dam failure, the energy of the water stored behind even a small dam is capable of causing loss of life and great property damage if there are people downstream of the dam.[2]

Task Force Comments: According to the Task Force, there are no dams or levees in Gulf County, Port St. Joe, or Wewahitchka. The only dam posing a remote threat to Gulf County is Jim Woodruff Dam (shown in *Figure 4.1*). In the event of dam failure, the corresponding flooding would be similar to that of heavy rainfall.

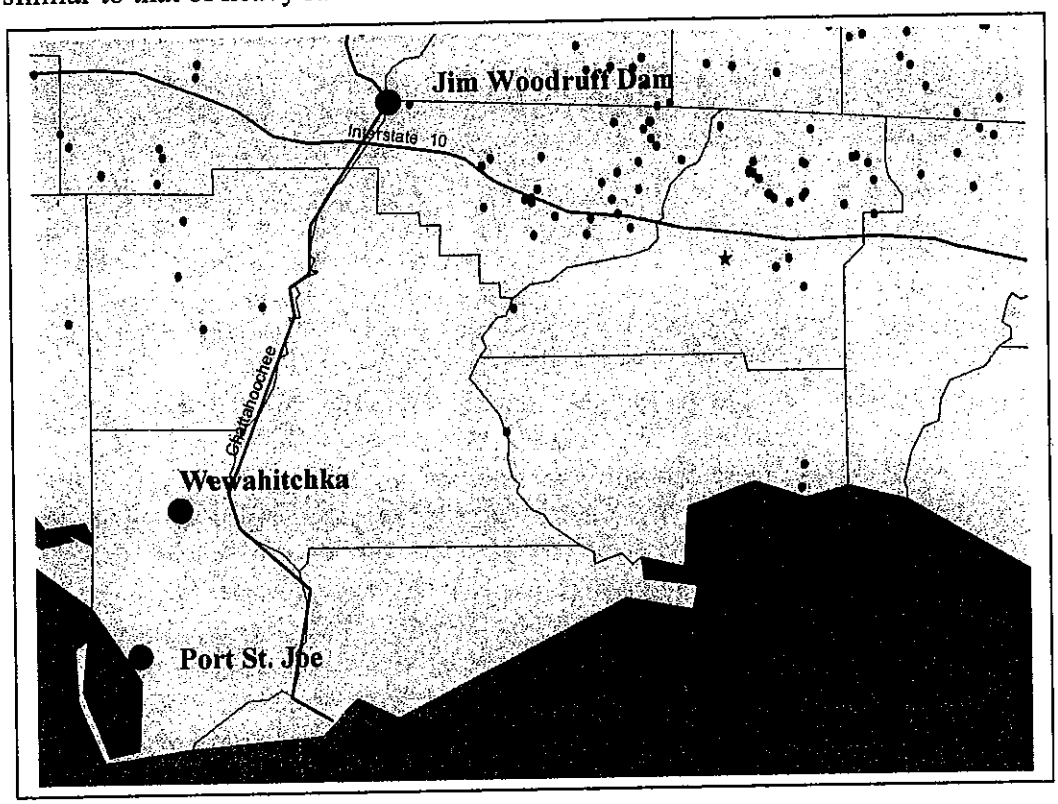


Figure 4.1. Jim Woodruff Dam Near Gulf County
Source: National Inventory of Dams. http://crunch.tec.army.mil/nid/webpages/nid.cfm

Hazard Score: 11

Potential Dollar Losses: There was insufficient information to generate an estimate of potential dollar losses resulting from dam and levee failure. Potential losses will be estimated as more information and technology becomes available. This capability will be reassessed each planning cycle.

[1] Online Dictionary. http://www.thefreedictionary.com
[2] Federal Emergency Management Agency website. http://www.fema.gov/hazards/damsafety/

Drought/Heat

Definition: Temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks are defined as extreme heat. Humid or muggy conditions, which add to the discomfort of high temperatures, occur when a "dome" of high atmospheric pressure traps hazy, damp air near the ground. Excessively dry and hot conditions can provoke dust storms and low visibility. Droughts occur when a long period passes without substantial rainfall. A heat wave combined with a drought is a very dangerous situation.[3]

Task Force Comments: Because Gulf County is a coastal county, it is not particularly prone to severe droughts. However, droughts have occurred as recently as 2000. Port St. Joe and Wewahitchka residents use deep wells as a water sources and thus are only affected by long-term drought. Rural residents who use shallow wells may be more affected. In addition, severe droughts may have an adverse affect on Gulf County's wetlands and exotic flora species. *Figure 4.2* shows the drought potential for the county during various times of the year according to the Drought Severity Index. For many months of the year, Gulf County is extremely moist and not susceptible to drought. During late spring and mid-summer, drought presents the greatest risks.

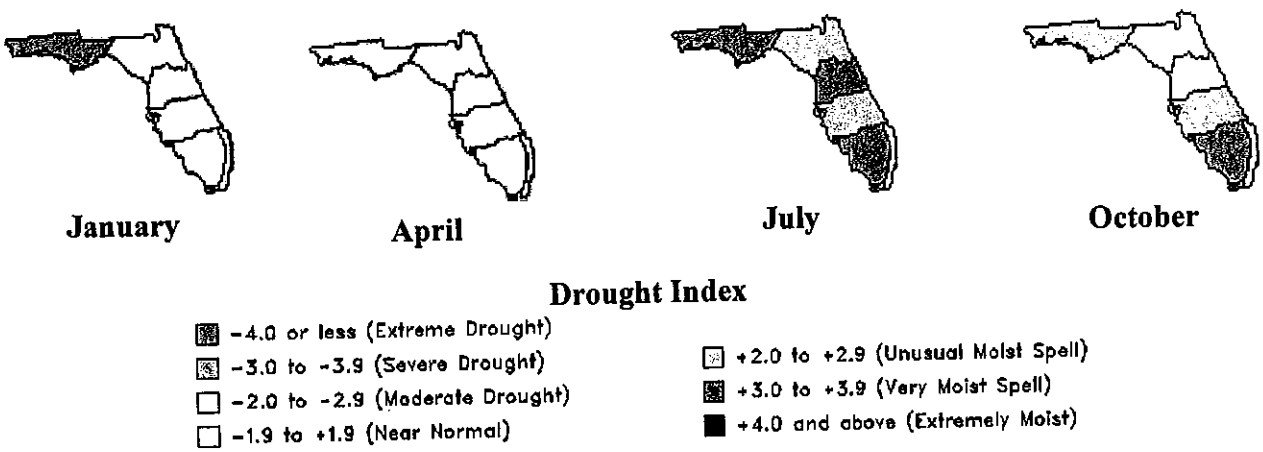


Figure 4.2. Seasonal Drought Severity Index
Source: National Weather Service, Climate Protection Center website.
http://www.cpc.ncep.noaa.gov/products/monitoring_and_data/drought.html

Hazard Score: 36

Potential Dollar Losses: Drought presents the greatest economic threat to the seafood industry. There was insufficient information to generate an estimate of potential dollar losses resulting from drought and extreme heat. Potential losses will be estimated as more information and technology becomes available. This capability will be reassessed each planning cycle.

[3] Federal Emergency Management website. http://www.fema.gov/hazards/extremeheat/heat.shtm

Earthquake

Definition: An earthquake is a sudden, rapid shaking of the Earth caused by the breaking and shifting of rock beneath the Earth's surface. This shaking can cause buildings and bridges to collapse; disrupt gas, electric, and phone service; and sometimes trigger landslides, avalanches, flash floods, fires, and huge, destructive ocean waves (tsunamis).[4]

Task Force Comments: The following map shows the Peak Ground Acceleration (PGA) values for the Central and East portions of the United States with a 10% chance of being exceeded over 50 years. According to the map, all of Gulf County, Florida is located in an area with 1%g peak acceleration and a relatively low seismic risk of an earthquake occurring. Earthquake is not considered to be a hazard applicable to Gulf County and a risk assessment was not conducted for Port St. Joe, Wewahitchka, or Gulf County unincorporated areas as part of the Gulf County Local Mitigation Strategy.

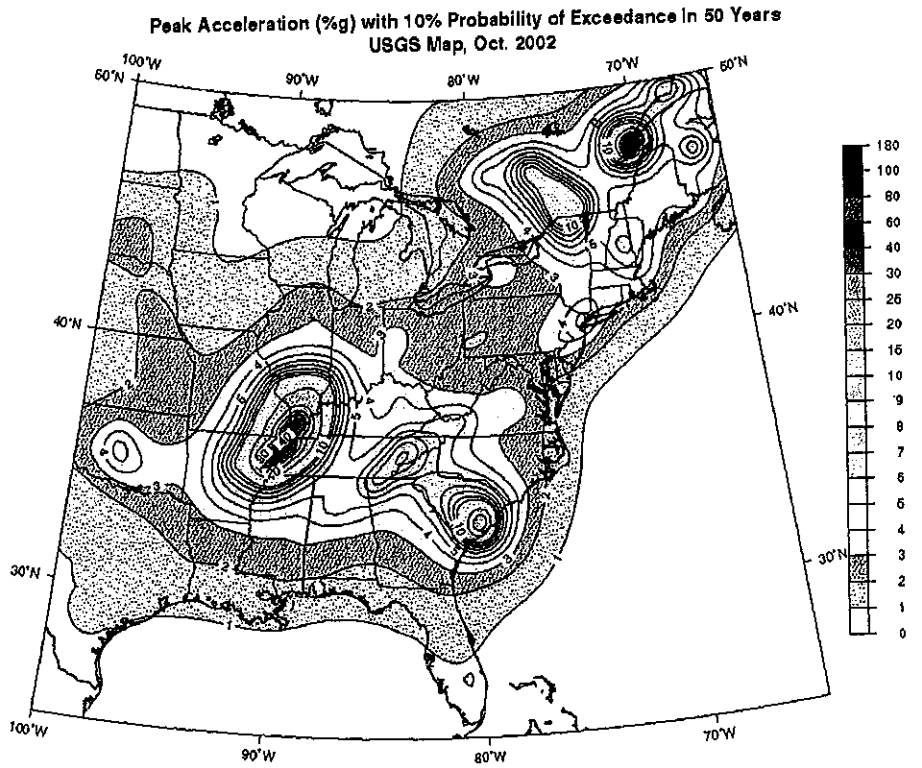


Figure 4.3. Earthquake Potential throughout the United States
Source: U.S. Geological Survey website. http://geohazards.cr.usgs.gov/.

Hazard Score: 0

Potential Dollar Losses: $0

[4] Federal Emergency Management website. http://www.fema.gov/hazards/earthquakes/

Flooding

Definition: A flood, as defined by the National Flood Insurance Program is: "A general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties (at least one of which is your property) from:

- Overflow of inland or tidal waters,
- Unusual and rapid accumulation or runoff of surface waters from any source, or
- A mudflow. [5]

While storm surge has been the number one cause of hurricane related deaths in the past, more people have died from inland flooding associated with tropical systems in the last 30 years. Flooding from hurricanes can occur hundreds of miles from the coast placing communities, which would not normally be affected by the strongest hurricane winds, in great danger. Some of the greatest rainfall amounts associated with tropical systems occur from weaker Tropical Storms that have a slow forward speed (1 to 10 mph) or stall over an area.[6]

According to the Saffir/Simpson Scale, hurricanes are assigned a designation of Category 1 through 5 depending on wind speeds in an effort to predict the potential damage that may be caused by the weather event. *Table 4.2* lists the flood effects associated with hurricane of different categories according to the Saffir/Simpson scale.

Table 4.2. Flood Effects Using the Saffir/Simpson Hurricane Scale

Category	Definition	Effects
One	Winds 74-95 mph	Some coastal road flooding and minor pier damage.
Two	Winds 96-111 mph	Coastal and low-lying escape routes flood 2-4 hours before arrival of center. Small craft in unprotected anchorages break moorings.
Three	Winds 111-130 mph	Flooding near the coast destroys smaller structures with larger structures damaged by floating debris. Terrain continuously lower than 5 feet above sea level (ASL) may be flooded inland 8 miles or more.
Four	Winds 131-155 mph	Major erosion of beach. Major damage to lower floors of structures near the shore. Terrain continuously lower than 10 feet ASL may be flooded requiring massive evacuation of residential areas inland as far as 6 miles.
Five	Winds greater than 155 mph	Major damage to lower floors of all structures located less than 15 feet ASL and within 500 yards of the shoreline. Massive evacuation of residential areas on low ground within 5 to 10 miles of the shoreline may be required.

Source: Federal Emergency Management Agency website. http://www.fema.gov/hazards/hurricanes/

[5] Federal Emergency Management Agency website. http://www.fema.gov/hazards/floods/
[6] Federal Emergency Management Agency website. http://www.fema.gov/hazards/hurricanes/

Task Force Comments: Coastal and riverine characteristics predominate in Gulf County. The two main cities are Port St. Joe and Wewahitchka.

The City of Port St. Joe is subject to flooding from rainfall ponding during periods of high rainfall, and to coastal storm surge flooding during hurricane or tropical storm activity. The community is primarily subject to coastal flooding from St. Joe Bay, although the amount of surge is reduced somewhat by St. Joe Peninsula. A bulkhead protects a portion of the waterfront adjacent to the Florida Coast Paper Mill. The City of Port St. Joe is also protected by a storm drainage system, which is adequate to protect the City from annual storm events but does not have sufficient capacity to handle the rainfall from a 100-year storm. Minor storm surge flooding has occurred during Hurricane Agnes (1972). Hurricane Eloise (1975) created flooding from bay waters 6.5 feet above normal, causing a washout of SR 30 at Lighthouse Point and flooding around Patton Bayou and along the bayfront. Coastal surge from Hurricane Frederick (1979) was 3.5-3.8 feet above mean high tide. Hurricane Kate (1985) caused major wind damage to roofing, power lines, and signs. About 200 feet of Constitution Drive was destroyed.

The major sources of flooding in Wewahitchka are two-fold: Riverine backwater and shallow flooding resulting from intense rainfall. The backwater effects are felt from the Apalachicola River system and Taylor Branch (sometimes known as Johnny Bell Creek locally). A majority of the backwater from Taylor Branch is a result of constrictive culverts under River Road and State Road 71. Runoff ponds behind both of these embankments.

The Chipola Cutoff just south of Dead Lake ties the Apalachicola and Chipola Rivers together. During times of high flows on the Apalachicola, a substantial portion of the flow is diverted to the Chipola River causing high stages along the eastern boundary of Wewahitchka. Significant flooding occurred in 1966, 1977, 1994, and 1998. The highest flooding of record occurred in September of 1929.

Table 4.3. Wewahitchka High-Water Mark Elevations

Location	
Gaskin Park Apalachicola River Gauge WAHF1 (44 mile marker)	1998 El Niño (gauge reading)
	28.50 feet **
	1977 Elevation (NGVD)
SR 22A, on east side of Weir Bridge and north side of Road	25.6 feet*
50 feet west of north end of Jehu Road at west arm of Dead Lake	26.9 feet*
	1929 Elevation (NGVD)
Point 33 feet west of East Fourth Street and 42 feet south of Lake Avenue	30.7 feet*

* Obtained by Florida Engineering Associates
** US Army Corps of Engineers website. http://www.sam.usace.army.mil/sam/en/enhw/wewa.gif

General flooding in Gulf County results from periods of intense rainfall causing ponding and sheet-runoff in the low, poorly drained areas. The Intracoastal Waterway-Gulf County Canal system does little to alleviate the County's drainage problem. The floodplains of the Apalachicola and Chipola Rivers and the Dead Lakes are subject to flooding during high river stages. Coastal areas are subject to flooding and wave action from hurricanes and tropical storms.

The terrain of the County is very low in elevation, sloping gently from the large, poorly-drained, swampy areas with elevations below 10 feet National Geodetic Vertical Datum (NGVD) that extend eastward from the Apalachicola River to higher areas in the northwest quadrant of the county that reach elevations of 60 feet NGVD. Elevations of 20 feet NGVD or more also exist along a coastal ridge of dunes.

The eastern portion of the county lies within the floodplain of the Apalachicola River and has been subject to river floods in 1929, 1960, 1966, 1977, 1994, and 1998. The 1929 flood was considered a 100-year flood and overtopped Highway 71 about seven miles south of Wewahitchka. The floods in 1960 and 1966 were considered 10-year and 20-year interval events respectively. The floods in 1994 and 1998 have been considered 35 to 50-year floods.

The Apalachicola River has a watershed that extends well into northern portions of Georgia and Alabama. Heavy rains well outside of Gulf County can result in flooding in Gulf County. Rain throughout the Southeast United States from the El Niño weather pattern resulted in another disaster declaration for Gulf County in 1998. The floodwaters reached high enough to isolate or damage 607 houses (268 single-family dwellings and 339 mobile or manufactured homes) in the county. In addition to overt damage, flooding can result in hidden damage such as septic tank failure, fuel tank failure, and contamination of water wells. There were also economic disruptions. The following pages summarize damage from the 1998 El Niño disaster and provide an example of how extensive damage can be even from a non-tropical storm event.

Gulf County Damage Assessment for El Niño Storm Events, March 1998

Structures Impacted by El Niño Floodwaters	
Total number of structures impacted:	613
Commercial structures impacted:	6
Minor damage	1
Major damage	5
Residential dwellings impacted:	607
Site Built dwellings impacted	268
Minor damage	145
Major damage	103
Destroyed	20
Manufactured dwellings impacted	339
Minor damage	223
Major damage	97
Destroyed	19

Economic Impacts of 1998 El Niño Floods

- Apalachicola and Northern Railroad: shut down due to flooded tracks
- Material Transfer, Inc. (coal transfer): unable to ship out due to flooded tracks
- Florida Coast Paper: unable to ship via barge due to build up of silt in Gulf County Canal
- Raffield's Fisheries: unable to get boats in or out. Estimated loss is $30,000 per day.
- Wood's Fisheries: unable to get boats in or out. Estimated loss is $25,000 per day.
- Premier, Inc.: shut down operations due to inability to get raw materials by rail.
- St. Joe Timberland, Inc.
  (a) unable to transport chips by rail from Lowry Chip Plant;
  (b) had extensive damage to roads and culverts;
  (c) cut back logging operations due to soggy soil conditions; and
  (d) may have experienced damage to tree crop.

Table 4.4. Areas Affected by 1998 El Niño Floodwaters

Stonemill Creek	Midway Park Area
Idlewood Drive Area	Our Town Road Area
Brian Setterich Road Area	Gaskin Side Camp Area
Lake Height Subdivision	West Arm Creek Area
Willis Landing	White City Area
Jehu Road Area	Lake Grove Road Area
Red Bull Island Area	East River Road Area
Roberts Cemetery Area	Bryant's Landing Area
Douglas Landing Area	Howard Creek Area

Table 4.5. Areas Losing Electrical Service During El Niño

Lister's Landing	Howard's Creek Area
Douglas Landing	West Arm Creek
Willis Landing	Red Bull Island

Road and Bridge Damage Assessment from 1998 El Niño Floods

- Gaskin side of Camp Road-Pipe separated in several places under road before pit.
- Dalkieth Road-Undermined up to 3 feet near culvert at Mace Martin ditch for 15 feet length.
- Clyde Tent Road-Topsoil washed away at mouth of road. Blowout halfway down road that is 15 feet wide and waist deep.
- St. Joe Beach-Ditch flooded on Americus Ave., crossed Americus and flooded several houses. Perhaps larger pipes in ditch would help run off.
- Daniels Road-Topsoil washed off at big ditch area. One blowout is about 20' wide and 3' deep across road.
- Chipola Cutoff Road-Topsoil washed off.
- Iola Road-Sand washed off in several places.
- Roberts Cemetery Road-Topsoil washed off road
- Whitfield Landing Road-2 pipes exposed and dirt on shoulders is washed away.

- Buddy Floore Road-Road caved in at east end of bridge. Hole in road. Needs headwall replaced.
- Pleasant Rest Road-Several small washouts across road.

Howards Creek

- Hwy. 387-Two blowouts on shoulder up to edge of pavement about 2' deep, 20 feet wide and 10' long (about 2 loads of dirt).
- Shoulder washout in front of Carol's Store on south side of road about 75' long (387?).
- Squirrel Ave.-Shoulder washouts. In two places they are about 10' under pavement (about 3 loads of dirt).
- Murphy Road-Small washouts before Calf Barn Road. About 10' deep (2 loads of dirt).
- Intersection of Blossom Hill and Murphy Road-Topsoil washed off edge of paved road and dirt road at intersection. (About 2 loads to fix).
- Topsoil washed away at South Louise Ave and Murphy (Several loads of dirt to fix).
- Kim Ave.-Several d/w turnouts need about 8" of dirt (1 flatbed load).
- South Duck and Murphy Road-Washed out at intersection. Drop off at edge of pavement. Part of intersection still under water 3/20/98. Will need 2-3 loads of dirt.
- Washout under bridge approach near Carol's Store on west side of Hwy. 387 bridge (Doc Whitfield Road).
- 610 Bay City Road-Driveway drop off at Fish Head's Place (about 1 load) plus 2 or 3 more driveways needing about 2 more loads).
- Bay City Road-Topsoil washed off road and road completely washed out. Need bigger pipes or culvert.
- Sauls Creek Road-Completely washed out for several hundred yards.
- Damage to box culvert before Deep Slough Bridge-2' hole on north side of #1 culvert under headwall
- Deep Slough Bridge-Sandbags missing on each side of bridge.
- Bridge near Carol's Store-Washout under approach on west end. 6' under edge of road, length of approach 20' long. Sandbags missing under bridge on west under cap sill.

It is clear from the preceding information that Gulf County is extremely flood prone. Approximately 28 percent of the residents and 34 percent of the residential dwellings in Gulf County are located in the 100-year flood plain. In 1990 figures, over $111 million in property is located in the flood plain.

Flooding patterns for Gulf County can be observed using the MEMPHIS Output System. Flood analysis is separated into the two main sources: coastal flooding caused by hurricanes and riverine flooding. This scale is discussed further in the High Winds portion of this section. Figures *4.4*, *4.5*, *4.6*, *4.7*, and *4.8* the peak storm surge expected at a site and the corresponding flood zones of Category 1 to 5 hurricanes.

Chris Tightow

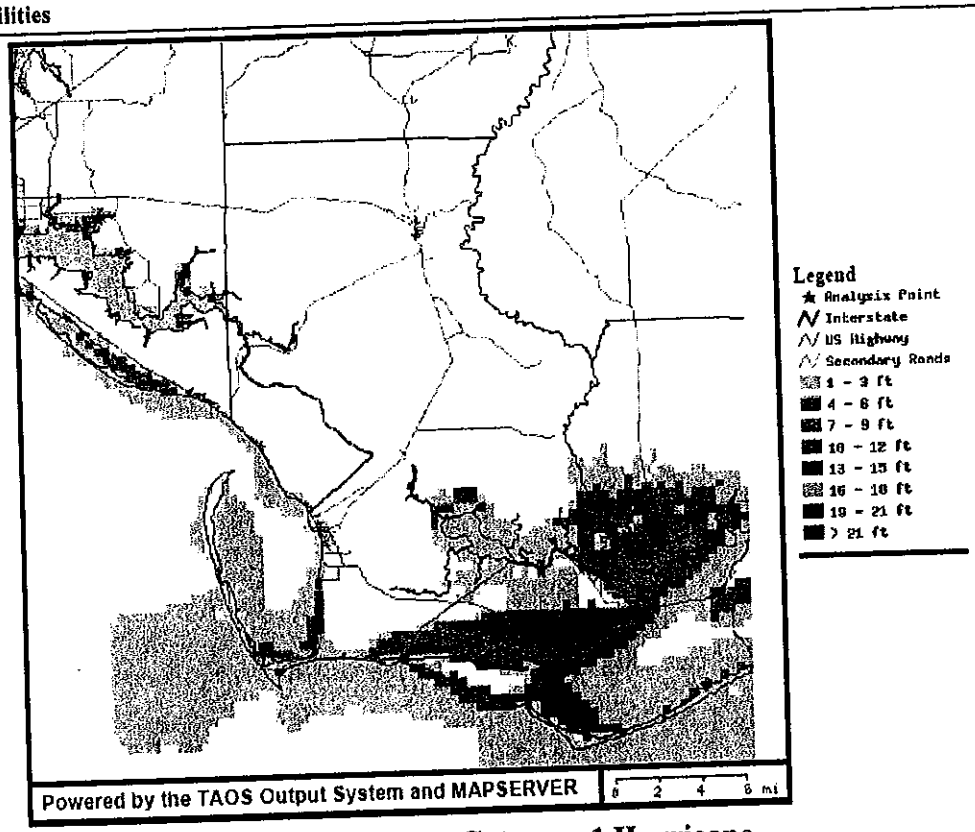


Figure 4.4. Flood Zone for a Category 1 Hurricane

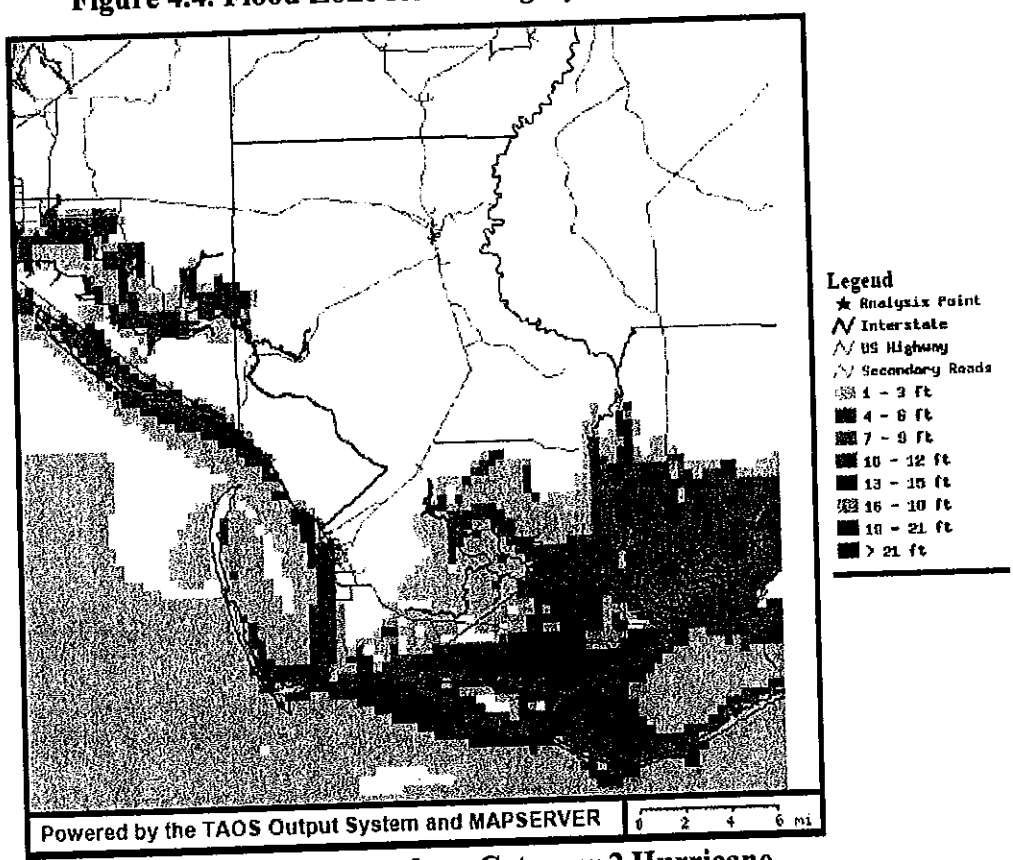


Figure 4.5. Flood Zone for a Category 2 Hurricane

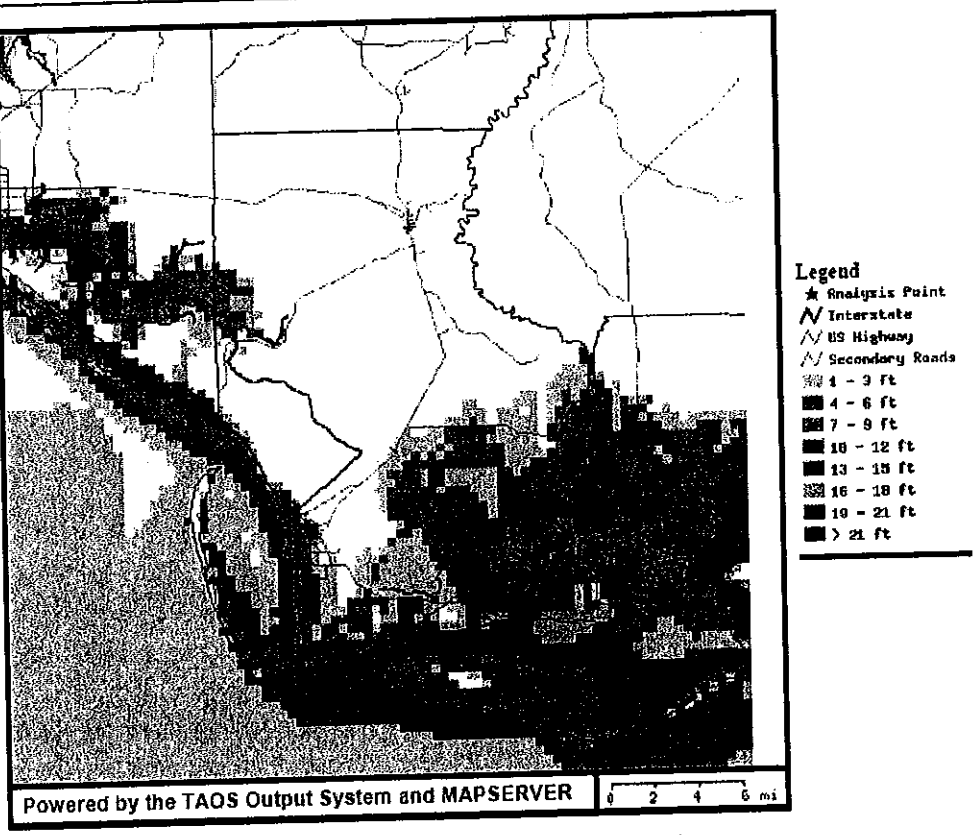


Figure 4.6. Flood Zone for a Category 3 Hurricane

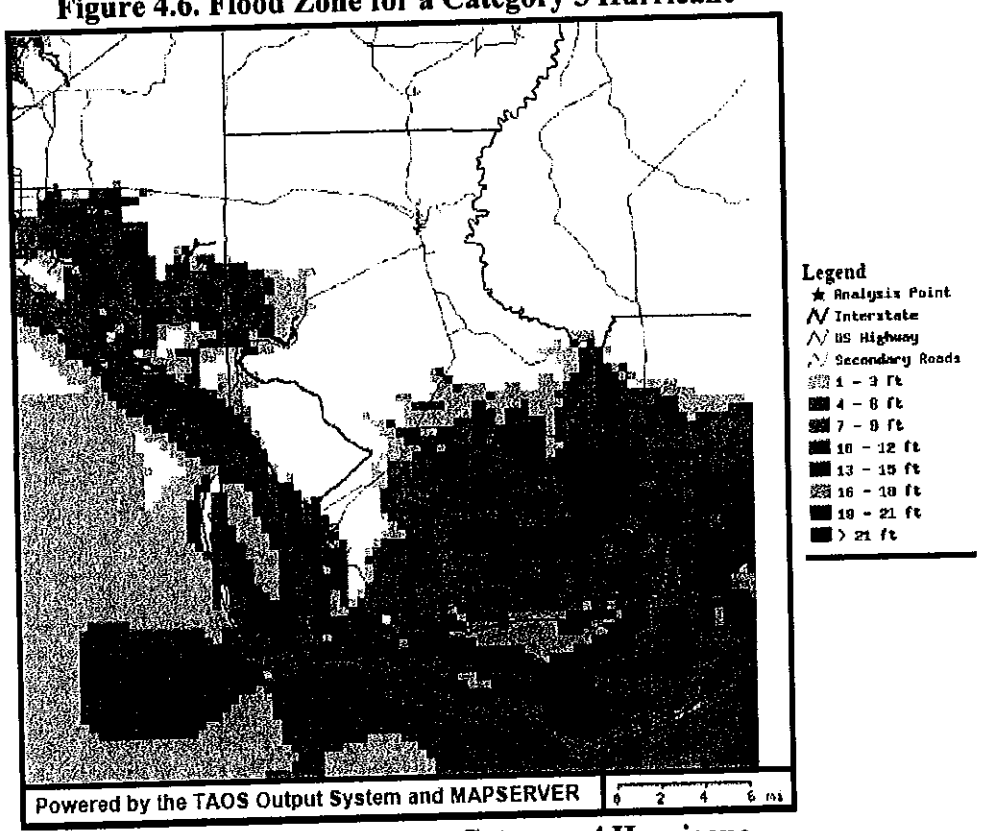


Figure 4.7. Flood Zone for a Category 4 Hurricane

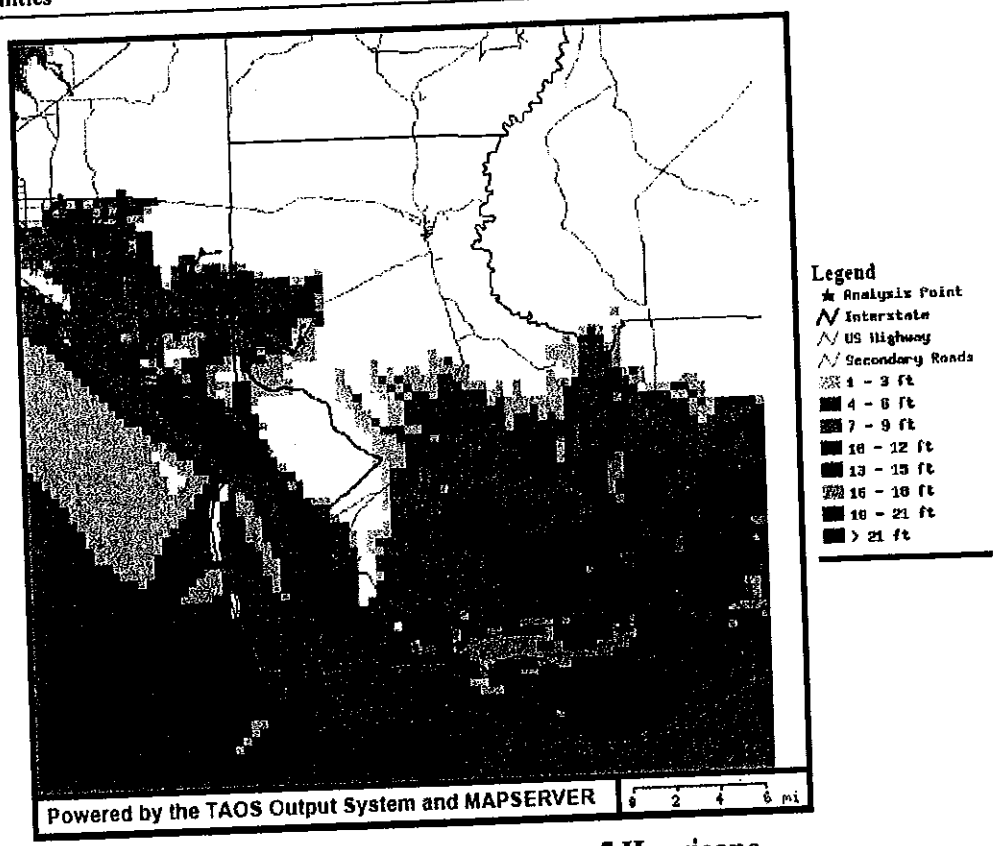


Figure 4.8. Flood Zone for a Category 5 Hurricane

Similarly, 10, 25, 50, and 100-year flood zones by rainfall, ponding, or riverine flooding are shown in Figures *4.9*, *4.10*, *4.11*, and *4.12*.

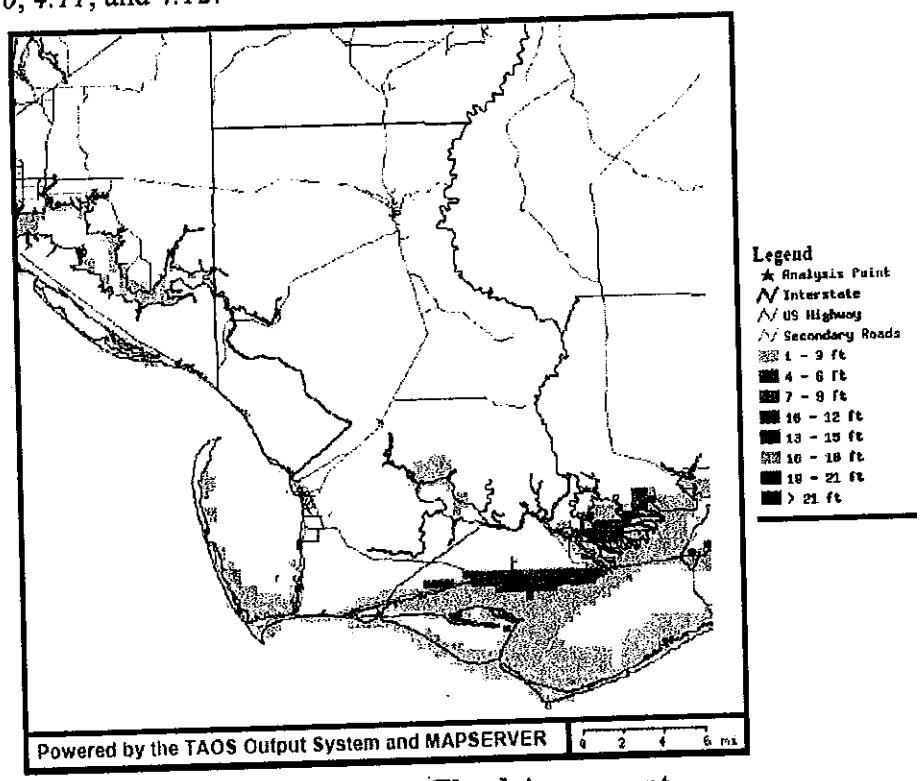


Figure 4.9. 10-Year Flood Assessment

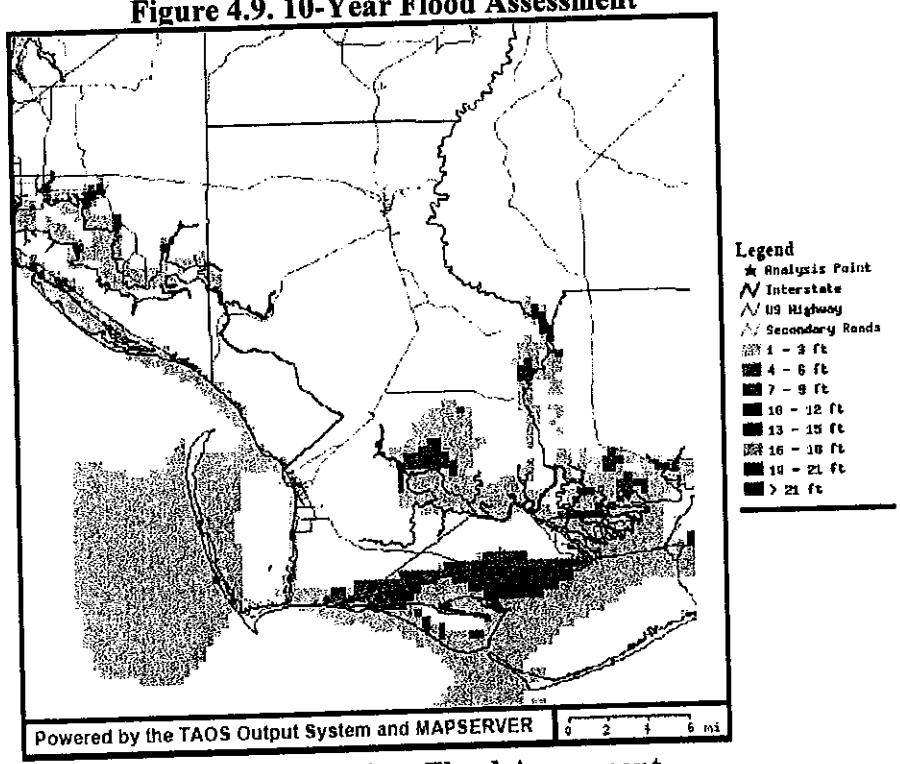
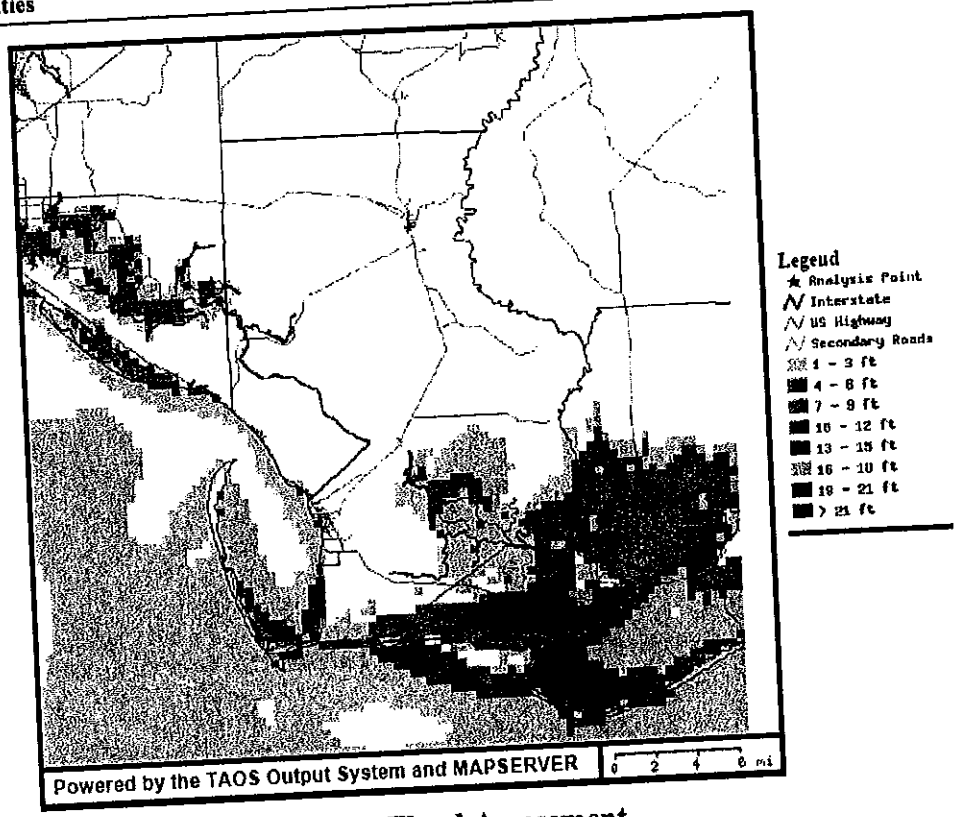
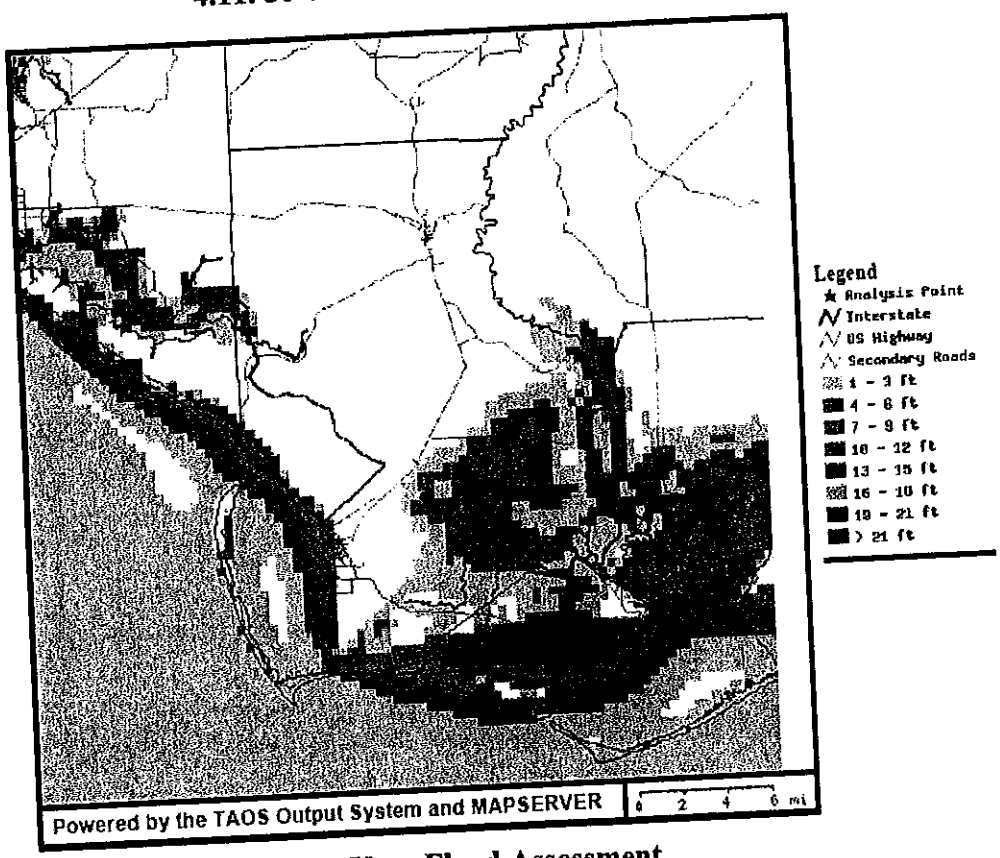


Figure 4.10. 25-Year Flood Assessment



4.11. 50-Year Flood Assessment



4.12. 100-Year Flood Assessment

Hazard Score: 50

Potential Dollar Losses: *Tables 4.6, 4.7,* and *4.8* show the potential dollars for Gulf County resulting from hurricane and riverine flooding generated by MEMPHIS. There is an additional event based estimate for hurricanes which lists dollar losses produced from historic loss data models not using the maximum potential damage caused by the hazard. Actual annual economic loss estimates from flooding are $11,842,080.

Table 4.6. Potential Losses from Hurricane Flooding

Intensity	Population	Structures	Potential Dollar Value	Event Based Estimate
Gulf County				
Category 1	1,102	1,112	$94,529,408	$17,911,378
Category 2	1,630	1,620	$125,487,432	$46,611,536
Category 3	1,879	2,094	$146,516,064	$101,408,776
Category 4	2,522	2,618	$211,091,408	$198,723,632
Category 5	2,405	2,754	$227,797,968	$255,289,264
Port St. Joe				
Category 1	0	546	$51,491,628	
Category 2	7,786	1,559	$105,690,181	
Category 3	8,312	1,211	$69,089,416	
Category 4	4,618	412	$23,782,976	
Category 5	4,618	998	$50,915,716	
Wewahitchka				
Category 1	0	0	$0	
Category 2	0	0	$0	
Category 3	0	0	$0	
Category 4	0	0	$0	
Category 5	0	0	$0	

Source: MEMPHIS data, 2004.

Building Type	Category 1	Category 2	Category 3	Category 4	Category 5
Gulf County (unincorporated)					
Single Family	$64,028,920 (819)	$77,212,072 (1,120)	$90,070,232 (1,410)	$90,455,416 (1,552)	$100,577,264 (1,663)
Mobile Homes	$2,199,896 (123)	$5,169,347 (270)	$8,291,463 (397)	$9,943,602 (493)	$10,668,294 (498)
Multi-family	$0 (0)	$0 (0)	$0 (0)	$2,534,353 (60)	$2,534,353 (60)
Hotels	$258,470 (3)	$72,317 (2)	$106,035 (4)	$33,717 (2)	$33,717 (2)
Commercial	$2,929,902 (68)	$1,637,266 (39)	$1,951,620 (53)	$20,170,073 (70)	$1,617,965 (69)
Industrial	$1,370,225 (7)	$381,446 (4)	$207,880 (4)	$748,981 (16)	$3,530,881 (16)
Government	$1,636,939 (4)	$5,410,197 (9)	$4,111,810 (15)	$2,783,798 (34)	$3,087,327 (35)
Port St. Joe					
Single Family	$27,615,852 (435)	$62,858,140 (1,256)	$45,000,036 (984)	$15,817,456 (348)	$17,730,836 (392)
Mobile Homes	$193,370 (18)	$672,206 (51)	$750,497 (43)	$275,141 (11)	$304,567 (14)
Multi-family	$0 (0)	$0 (0)	$0 (0)	$0 (0)	$0 (0)
Hotels	$96,705 (1)	$346,435 (3)	$249,729 (2)	$249,729 (2)	$249,729 (2)
Commercial	$4,402,734 (45)	$9,779,121 (137)	$6,755,297 (100)	$2,306,195 (25)	$2,583,548 (28)
Industrial	$8,639,647 (4)	$10,407,539 (35)	$1,767,892 (31)	$214,882 (5)	$214,882 (5)
Government	$2,842,186 (7	$8,065,586 (16)	$5,187,999 (8)	$706,705 (4)	$706,705 (4)
Wewahitchka					
Single Family	$0 (0)	$0 (0)	$0 (0)	$0 (0)	$0 (0)
Mobile Homes	$0 (0)	$0 (0)	$0 (0)	$0 (0)	$0 (0)
Multi-family	$0 (0)	$0 (0)	$0 (0)	$0 (0)	$0 (0)
Hotels	$0 (0)	$0 (0)	$0 (0)	$0 (0)	$0 (0)
Commercial	$0 (0)	$0 (0)	$0 (0)	$0 (0)	$0 (0)
Industrial	$0 (0)	$0 (0)	$0 (0)	$0 (0)	$0 (0)
Government	$0 (0)	$0 (0)	$0 (0)	$0 (0)	$0 (0)

Source: MEMPHIS data, 2004.
Note: The numbers in parentheses indicate the number of structures vulnerable to the hazards in each category.

Table 4.7. Potential Losses from Riverine Flooding

Frequency	Population	Structures	Potential Dollar Value
Gulf County			
10-Year	1,102	453	$37,274,112
25-Year	1,102	1,028	$85,822,992
50-Year	605	1,512	$122,344,360
100-Year	1,630	1,623	$124,965,504
Port St. Joe			
10-Year	0	33	$2,753,811
25-Year	0	546	$51,491,628
50-Year	3,694	1,321	$96,858,896
100-Year	8,312	1,557	$104,334,016
Wewahitchka			
10-Year	0	0	$0
25-Year	0	0	$0
50-Year	0	0	$0
100-Year	0	0	$0

Source: MEMPHIS data, 2004.

Building Type	10-Year	25-Year	50-Year	100-Year
Gulf County (unincorporated)				
Single Family	$27,963,180 (349)	$57,340,516 (749)	$76,290,024 (1,067)	$75,078,664 (1,111)
Mobile Homes	$910,969 (46)	$2,071,860 (116)	$4,009,358 (219)	$5,529,615 (280)
Multi-family	$0 (0)	$0 (0)	$0 (0)	$0 (0)
Hotels	$258,470 (3)	$258,470 (3)	$72,317 (2)	$72,317 (2)
Commercial	$1,266,138 (23)	$2,577,250 (65)	$3,087,960 (71)	$1,977,031 (56)
Industrial	$1,326,752 (5)	$1,370,225 (7)	$1,472,638 (7)	$155,268 (3)
Government	$1,760,586 (3)	$2,823,997 (5)	$5,886,315 (9)	$5,762,550 (11)
Port St. Joe				
Single Family	$2,022,038 (23)	$27,615,852 (435)	$56,702,980 (1,051)	$62,042,000 (1,258)
Mobile Homes	$16,400 (1)	$193,370 (18)	$639,301 (47)	$847,395 (56)
Multi-family	$0 (0)	$0 (0)	$0 (0)	$0 (0)
Hotels	$0 (0)	$96,705 (1)	$96,705 (1)	$346,435 (3)
Commercial	$27,658 (1)	$4,666,098 (52)	$8,610,535 (123)	$9,751,462 (136)
Industrial	$0 (0)	$8,639,647 (4)	$10,192,657 (30)	$10,407,539 (35)
Government	$369,164 (2)	$5,508,409 (10)	$7,601,468 (15)	$7,696,422 (14)
Wewahitchka				
Single Family	$0 (0)	$0 (0)	$0 (0)	$0 (0)
Mobile Homes	$0 (0)	$0 (0)	$0 (0)	$0 (0)
Multi-family	$0 (0)	$0 (0)	$0 (0)	$0 (0)
Hotels	$0 (0)	$0 (0)	$0 (0)	$0 (0)
Commercial	$0 (0)	$0 (0)	$0 (0)	$0 (0)
Industrial	$0 (0)	$0 (0)	$0 (0)	$0 (0)
Government	$0 (0)	$0 (0)	$0 (0)	$0 (0)

Source: MEMPHIS data, 2004.
Note: The numbers in parentheses indicate the number of structures vulnerable to the hazards in each category.

Hail

Definition: Hail is precipitation in the form of lumps of ice produced by convective clouds. Hail typically accompanies thunderstorms. Because hail needs convective clouds and strong updrafts to increase in size, hail storms are more frequent in warmer months (spring and early summer) when these conditions are present.[7]

Task Force Comments: Hail accompanies only a few thunderstorms that affect Gulf County. Damage has previously occurred to cars in parking lots. *Figure 4.13* shows the recent hail damage locations.

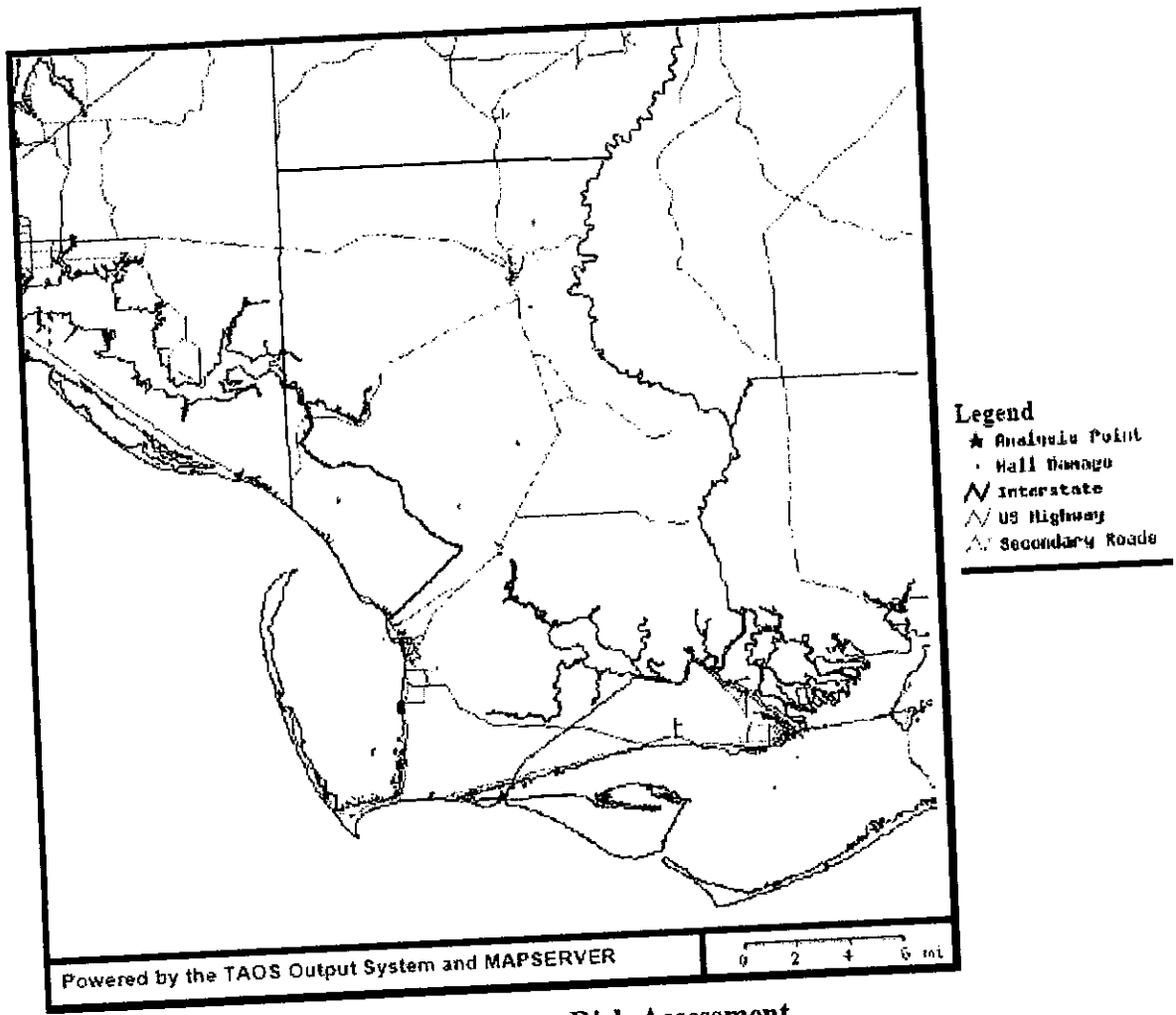


Figure 4.13. Hail Damage Risk Assessment

Hazard Score: 12

Potential Dollar Losses: There was insufficient information to generate an estimate of potential dollar losses resulting from hail. Potential losses will be estimated as more information and technology becomes available. This capability will be reassessed each planning cycle.

[7] National Weather Service website. http://www.erh.noaa.gov/er/cae/svrwx/hail.htm

High Wind

Definition: A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud. It is spawned by a thunderstorm (or sometimes as a result of a hurricane) and produced when cool air overrides a layer of warm air, forcing the warm air to rise rapidly. The damage from a tornado is a result of the high wind velocity and wind-blown debris. Tornado season is generally March through August, although tornadoes can occur at any time of year. *Table 4.9* lists the damages associated with tornadoes of different categories according to the Fujita-Pearson tornado scale.[8]

Table 4.9. Fujita-Pearson Tornado Scale

Category	Definition	Effects
F-0	Winds 40-72 mph	Chimney damage, tree branches broken.
F-1	Winds 73-112 mph	Mobile homes pushed off foundation or overturned.
F-2	Winds 113-157 mph	Considerable damage, mobile homes demolished, trees uprooted.
F-3	Winds 158-205 mph	Roofs and walls torn down, trains overturned, cars thrown.
F-4	Winds 207-260 mph	Well-constructed walls leveled
F-5	Winds 261-318 mph	Homes lifted off foundation and carried considerable distances, automobiles thrown as far as 100 meters

Federal Emergency Management Agency website. http://www.fema.gov/hazards/tornadoes/

A hurricane is a tropical storm with winds that have reached a constant speed of 74 miles per hour or more. Hurricane winds blow in a large spiral around a relative calm center known as the "eye." The "eye" is generally 20 to 30 miles wide, and the storm may extend outward 400 miles. As a hurricane approaches, the skies will begin to darken and winds will grow in strength. As a hurricane nears land, it can bring torrential rains, high winds, and storm surges. August and September are peak months during the hurricane season that lasts from June 1 through November 30. *Table 4.10* lists the damages associated with hurricanes of different categories according to the Saffir/Simpson scale.[9]

[8] Federal Emergency Management Agency website. http://www.fema.gov/hazards/tornadoes/
[9] Federal Emergency Management Agency website. http://www.fema.gov/hazards/hurricanes/

Table 4.10. Wind Effects using the Saffir/Simpson Scale

Category	Definition	Effects
One	Winds 74-95 mph	No real damage to building structures. Damage primarily to unanchored mobile homes, shrubbery, and trees.
Two	Winds 96-110 mph	Some roofing material, door, and window damage to buildings. Considerable damage to vegetation, mobile homes, and piers.
Three	Winds 111-130 mph	Some structural damage to small residences and utility buildings with a minor amount of curtainwall failures. Mobile homes are destroyed.
Four	Winds 131-155 mph	More extensive curtainwall failures with some complete roof structure failure on small residences.
Five	Winds greater than 155 mph	Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away.

Federal Emergency Management Agency website. http://www.fema.gov/hazards/hurricanes/

Task Force Comments: Historically, Gulf County has not been impacted by the intense tornadoes for which the Midwestern United States is known. The intensity of tornadoes is measured by the Fujita scale, which evaluates the damage and destruction caused by a storm passing over man-made structures. According to this scale, an F0-F1 tornado is weak, F2-F3 is rated as strong, and F4-F5 is considered to be extremely violent. Since 1954, a total of 21 tornadoes have been reported in the county. Nearly all of these tornadoes were relatively weak F0 and F1 events. It should be noted that this table reflects only those tornadoes that have been reported; it is likely that others have occurred in rural areas or touched down only briefly and were not reported. One of the primary concerns associated with tornadoes is the lack of warning time prior to a tornado touching down. Increasingly, the National Weather Service has been able to provide local emergency management agencies with advance warning of storm fronts that have the potential to spawn tornadic activity.

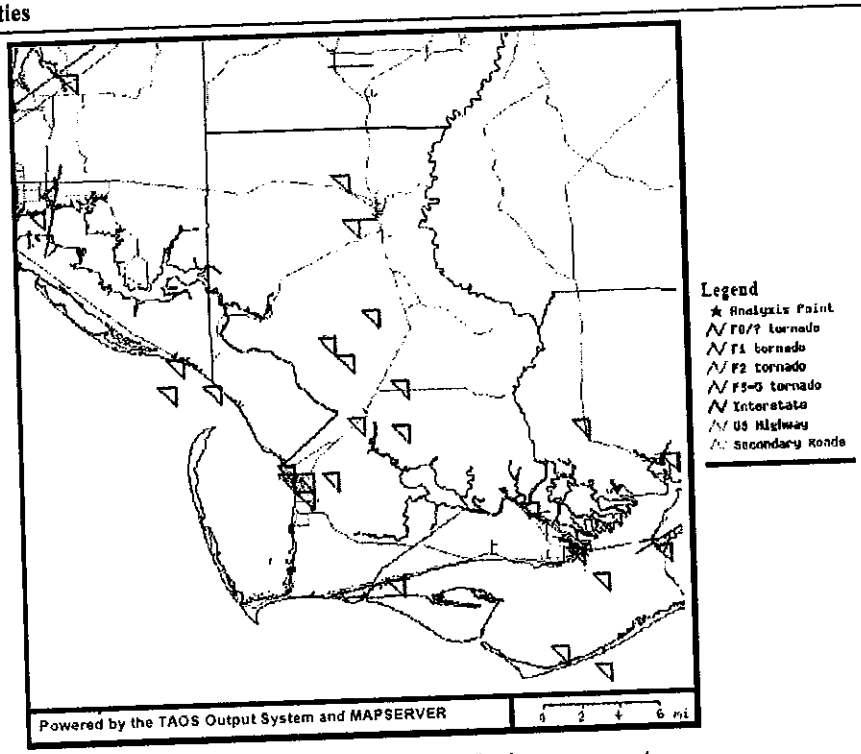


Figure 4.14. Tornado Risk Assessment

Table 4.11. Gulf County Tornadoes, 1954-2004

Date	Dead	Injured	F-scale
April 16, 1954	0	0	F1
September 1956	0	0	F2
September 15, 1960	0	0	F0
December 10, 1967	0	0	F2
July 10, 1970	0	0	F1
March 2, 1972	0	0	F1
October 27, 1972	0	1	F2
March 9, 1976	0	0	F0
December 24, 1978	0	0	F1
January 23, 1980	0	0	F0
July 12, 1989	0	0	F1
February 17, 1992	0	0	F1
February 17, 1992	0	0	F0
January 24, 1993	0	2	F1-$50,000 damage
October 30, 1993	0	0	F0
February 17, 1995	0	0	F0
March 7, 1996	0	0	F0-$2,000 damage
November 13, 1997	0	0	F0-$5,000 damage
March 7, 1998	0	0	F0-$35,000 damage
March 8, 1998	0	0	F0-$25,000 damage
January 2, 1999	0	0	F0-$30,000 damage

Source: Tornado Project website. http://www.tornadoproject.com.

Tornadoes have occurred throughout Gulf County and have developed from severe storm systems over land as well as from waterspouts coming ashore. The entire population of the county is vulnerable to the effects of tornadoes. Populations especially vulnerable are those residing in older manufactured homes and substandard site-built homes.

Hurricanes and tropical storms cause coastal flooding and wind damage. High winds from hurricanes damage buildings and vegetation directly as well as by impact from wind-borne debris. Generally, most of the buildings built along the coast are private property (home, commercial properties, restaurants, seafood industry, and recreational services). Consequently, these structures are at the greatest risk of coastal storm damage, often leading to disruptions in community life and local commerce. Coastal flooding can also adversely impact oyster harvests as Hurricane Kate did in 1985 by adversely affecting water quality.

Hurricanes and tropical storm events can be a source of catastrophic coastal flooding and wind damage. The damage from coastal flooding is primarily due to erosion and the battering effect of waves upon buildings, coastal structures, and near-shore septic tanks. High winds from hurricanes damage buildings, infrastructure, and vegetation directly as well as through impact with airborne debris. According to a National Ocean and Atmospheric Administration technical memorandum, Gulf County has a hurricane return period of 11 years. The return period is defined as the average number of years between landfalls. *Table 4.12* and *Figure 4.15* describe 22 tropical storms and hurricanes that have made landfall within 60 miles of Port St. Joe in the last 100 years. Several recent storms causing damage in Gulf County (Hurricanes Earl, Georges, and Opal) are not listed as they actually made landfall in excess of 60 miles from Port St. Joe. *Figure 4.16* shows the path of several tropical storms and hurricanes that made landfall in the north Florida panhandle during the 2004 hurricane season. The frequency with which Gulf County has been impacted by severe tropical weather dramatically underscores the importance of hazard mitigation along this vulnerable coast.

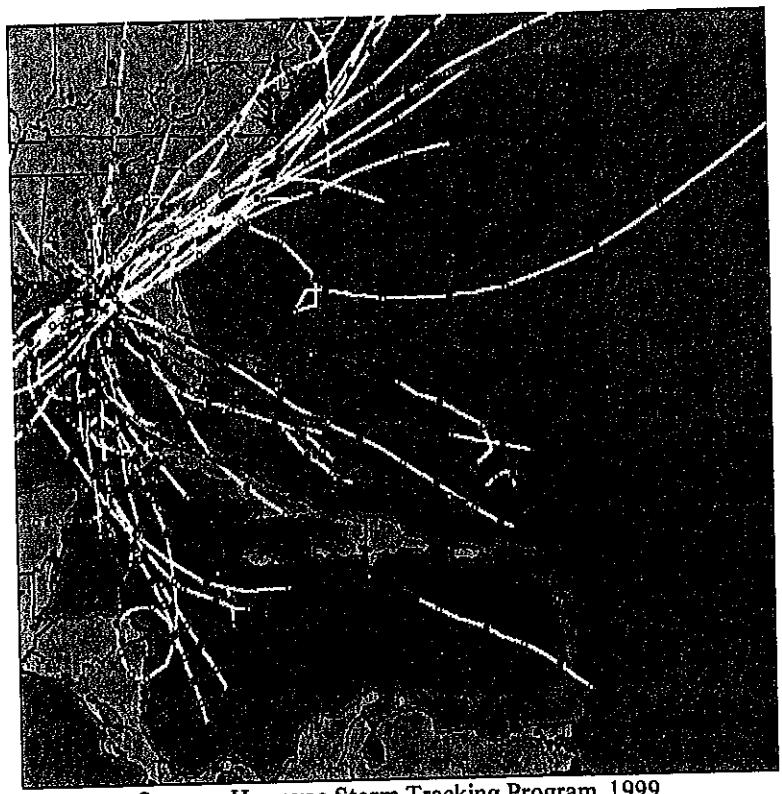
Table 4.12. Gulf County Hurricane Summary, 1900-2004

Year	Storm Name	Category*	Maximum Wind (KTS)
1901	Not Named	TS	45
1902	Not Named	TS	45
1907	Not Named	TS	50
1924	Not Named	1	70
1924	Not Named	TS	50
1928	Not Named	1	70
1929	Not Named	4	120
1932	Not Named	TS	45
1933	Not Named	TS	50
1933	Not Named	4	120
1935	Not Named	5	140
1938	Not Named	TS	40
1939	Not Named	1	70
1941	Not Named	3	105
1953	Not Named	TS	60
1953	Florence	3	110
1964	Dora	4	115
1966	Alma	3	110
1972	Agnes	1	95
1976	Subtrop 1	TS	45
1985	Kate	3	105
1994	Alberto	TS	56
1995	Allison	1	65
1995	Opal	3	134
1996	Josephine	TS	60
1998	Earl	1	85
1998	Georges	1	135
2000	Helene	TS	60
2002	Isidore	1	110
2004	Bonnie	TS	65
2004	Charley	4	145
2004	Frances	2	135
2004	Ivan	3	165
2004	Jeanne	3	120

Source: Hurrevac Storm Tracking Program, 2004; National Weather Service website. http://www.aoml.noaa.gov/general/lib/lib1/nhclib/libpage13.htm

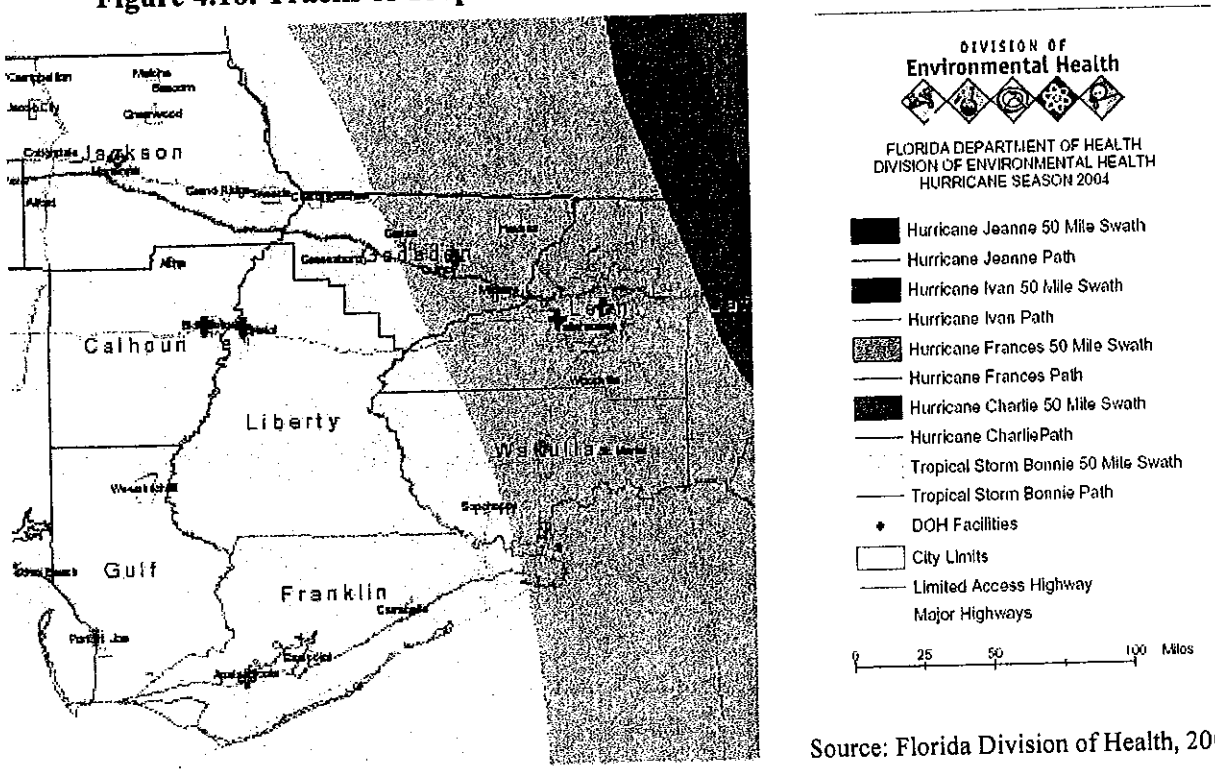
* Category when the storm made landfall near Gulf County.

Figure 4.15. Tracks of Tropical Storms and Hurricanes Within 60 miles of Port St. Joe, 1900-1996



Source: Hurrevac Storm Tracking Program, 1999.

Figure 4.16. Tracks of Tropical Storms and Hurricanes in Panhandle, 2004



Source: Florida Division of Health, 2004.

The high winds accompanying hurricanes can result in significant damage to homes, businesses, and critical infrastructure. It is important to understand however, that wind speeds generated by hurricanes can vary greatly throughout the county. For example, the coastal portion of the county may experience Category 1 force winds while an interior, protected part of the county may only experience weak tropical storm force winds. Planners and emergency management personnel can use this information to make informed decisions regarding the location of future critical facilities such as emergency shelters. This information an also be used to identify critical facilities that may need to be retrofitted to improve their ability to withstand high winds. A series of maps at the end of this section displays differences in wind speeds for Category 1 through 5 hurricanes striking Gulf County.

Damages from coastal flooding are primarily due to erosion and the battering effect of waves upon buildings, coastal structures, and near-shore septic tanks. Coastal portions of Gulf County have been subjected to significant coastal flooding and storm surge from several hurricanes in recent years including Hurricane Eloise in 1975, Hurricanes Elena and Kate in 1985, and Hurricane Opal in 1995. Hurricane Kate destroyed or caused major damage to 31 structures apart from roads. In Highland View, approximately 100 feet of Highway 98 was damaged and 90 feet of a sloping concrete revetment were destroyed. Hurricane Kate's storm surge caused extensive erosion on Cape San Blas. Profile data obtained by DEP's Bureau of Coastal Data Acquisition indicated that a dune in this area with an elevation of 13.5 feet NGVD was reduced to an elevation of 3 feet after Kate. Approximately 1,500 feet of the southern tip of Cape San Blas disappeared after Hurricane Elena passed 30 miles offshore September 1, 1985. The exposed southwest shore of Cape San Blas sustained heavy beach and dune erosion. *Tables 4.13* and *4.14* describe damage in Gulf County from Hurricanes Kate and Opal.

Table 4.13. Damage Summary for Hurricane Kate, Gulf County, 1985

290	feet sloping concrete slab revetment destroyed or damaged
65	feet steel bulkhead damaged
500	feet paved road destroyed
4	single family homes destroyed
12	single family homes sustained major structural damage
3	mobile homes destroyed
1	mobile home sustained major structural damage
2	Commercial building destroyed
6	Industrial buildings sustained major structural damage
1	public building sustained major structural damage
1	Fishing pier destroyed
1	Swimming pool destroyed
31	major structures (excluding roads) destroyed or sustained major structural damage

Source: DEP, Bureau of Beaches and Coastal Systems, 1986.

Table 4.14. Damage Summary for Hurricane Opal, Gulf County, 1995

26	major structures destroyed or sustained major damage
475	feet of revetment destroyed
2000	feet of County Road C30E destroyed at Stump Hole
700	feet of paved road on Air Force property

Source: DEP, Bureau of Beaches and Coastal Systems, 1998.

Damages incurred by local governments from major disasters such as hurricanes are recorded in Damage Survey Reports (DSR) and submitted to the Federal Emergency Management Agency (FEMA). Local governments are reimbursed by FEMA for 75 percent of the eligible disaster recovery expenses detailed in the DSRs. Eligible expenses include debris removal, overtime for government, and repairs to infrastructure such as government buildings, roads, drainage systems, and recreation equipment, are reimbursed. Currently, the State of Florida picks up 12.5 percent of the total expenses and the local government is responsible for the remaining 12.5 percent. In some cases, the requirement for the county to pay the local portion of the eligible disaster expenses can be waived by the Governor's Office if the county is financially unable to pay its share. An important point for local officials to recognize is that local governments will not always be able to have their local cost-share waived following a disaster. This should serve as a further incentive to support local mitigation activities. *Table 4.15* highlights Gulf County's expenses from some major disasters.

Table 4.15. Damage Survey Report Data for Gulf County

Disaster	Total DSR Expenses	Eligible DSR Expenses	Federal Portion	Local/State Portion
Kate		$205,682	$154,263	$51,419
TS Alberto		$947,922	$710,942	$236,981*
Opal	$1,182,143	$502,309	$376,734	$125,575*

* Local match paid for by the State of Florida

As shown in *Figure 4.12*, the hurricane season of 2004 brought a tropical storm and several hurricanes near Gulf County, each resulting in damage. Although the final dollar losses have yet to be calculated preliminary building damage counts are available. Four buildings were destroyed in Gulf County and 36 are considered condemned until repaired. Of the 36 condemned, five may be classified as destroyed.

Given the size and intensity of Atlantic tropical storms and hurricanes, the entire population of the county and all seasonal visitors is vulnerable to this hazard from June through November. Residents in coastal and low-lying areas are especially vulnerable to the high winds, storm surge, and flooding accompanying hurricanes. Figures *4.17*, *4.18*, *4.19*, *4.20*, and *4.21* the wind speeds expected from Category 1 to 5 hurricanes.

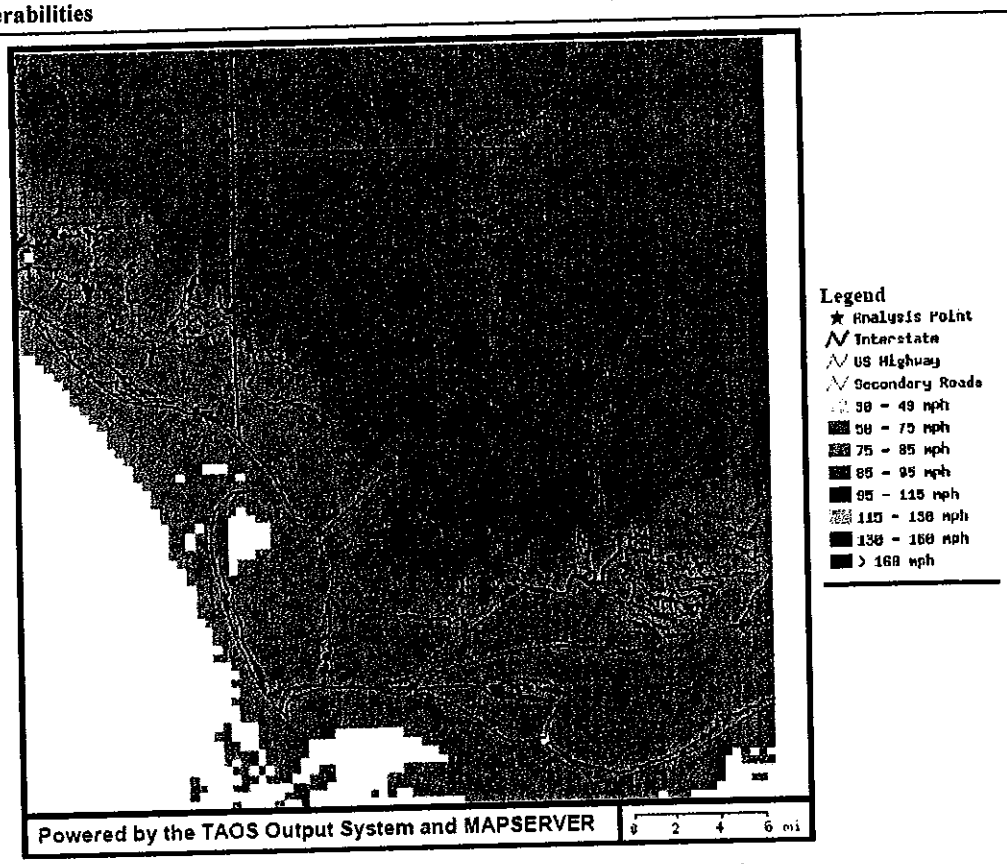


Figure 4.17. Wind Speeds for a Category 1 Hurricane

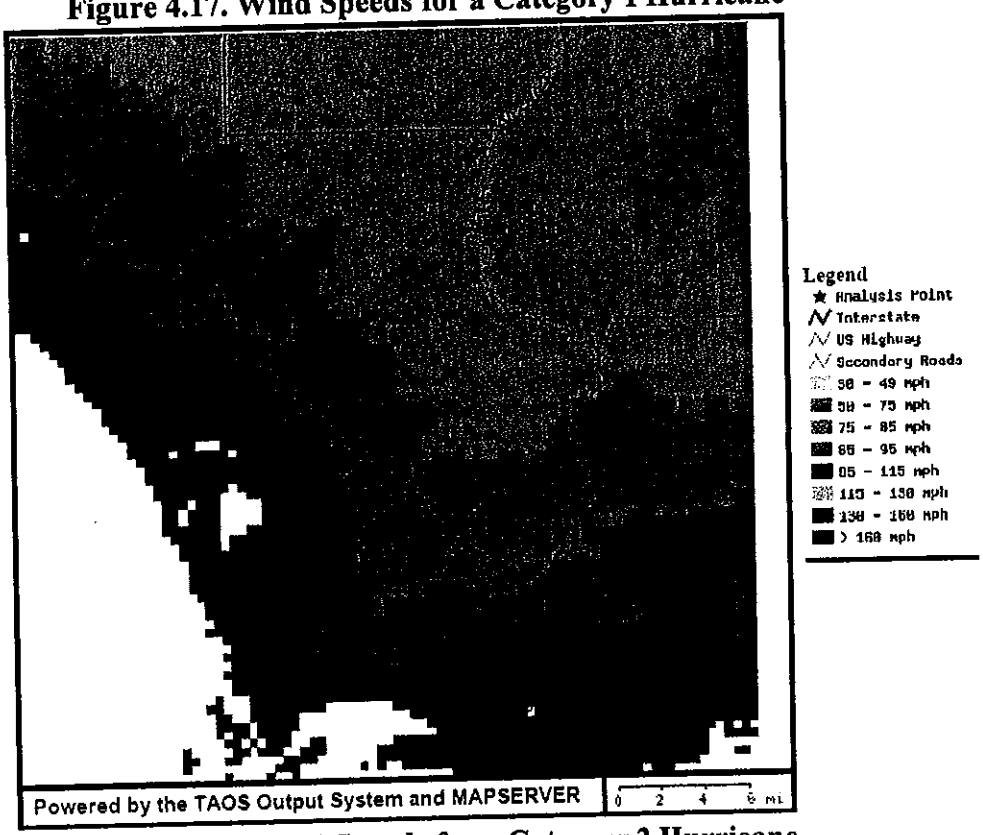


Figure 4.18. Wind Speeds for a Category 2 Hurricane

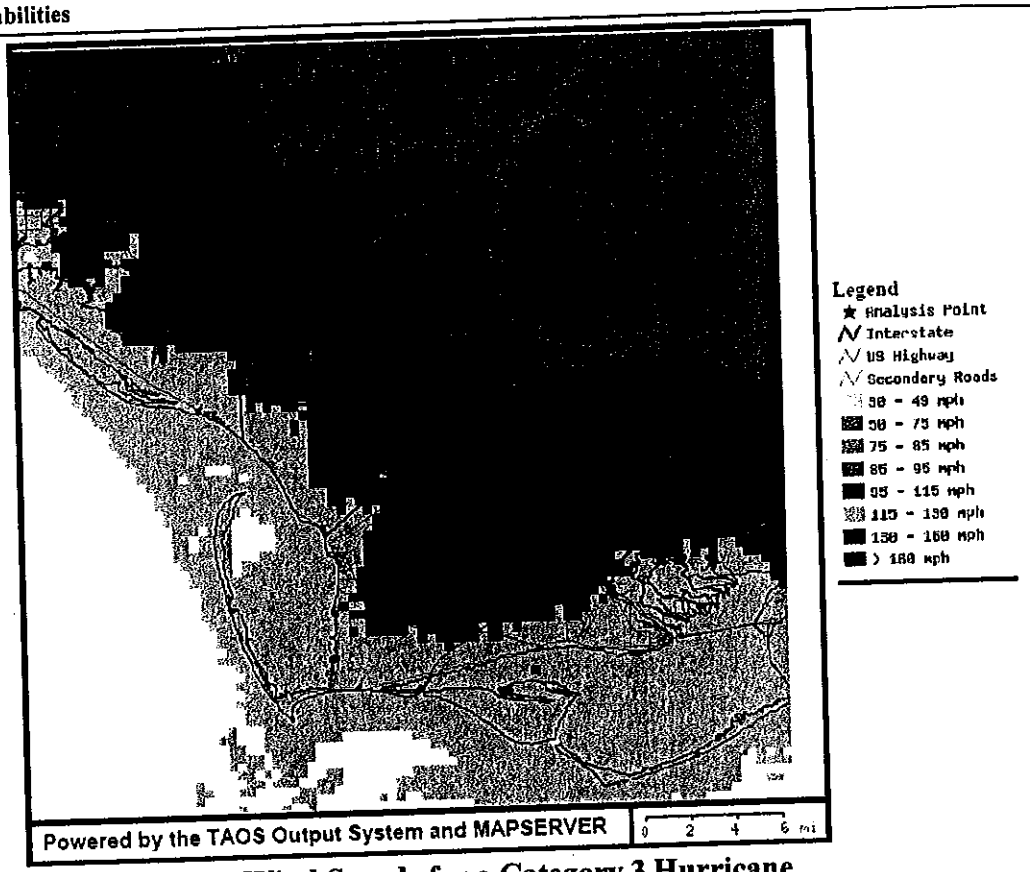


Figure 4.19. Wind Speeds for a Category 3 Hurricane

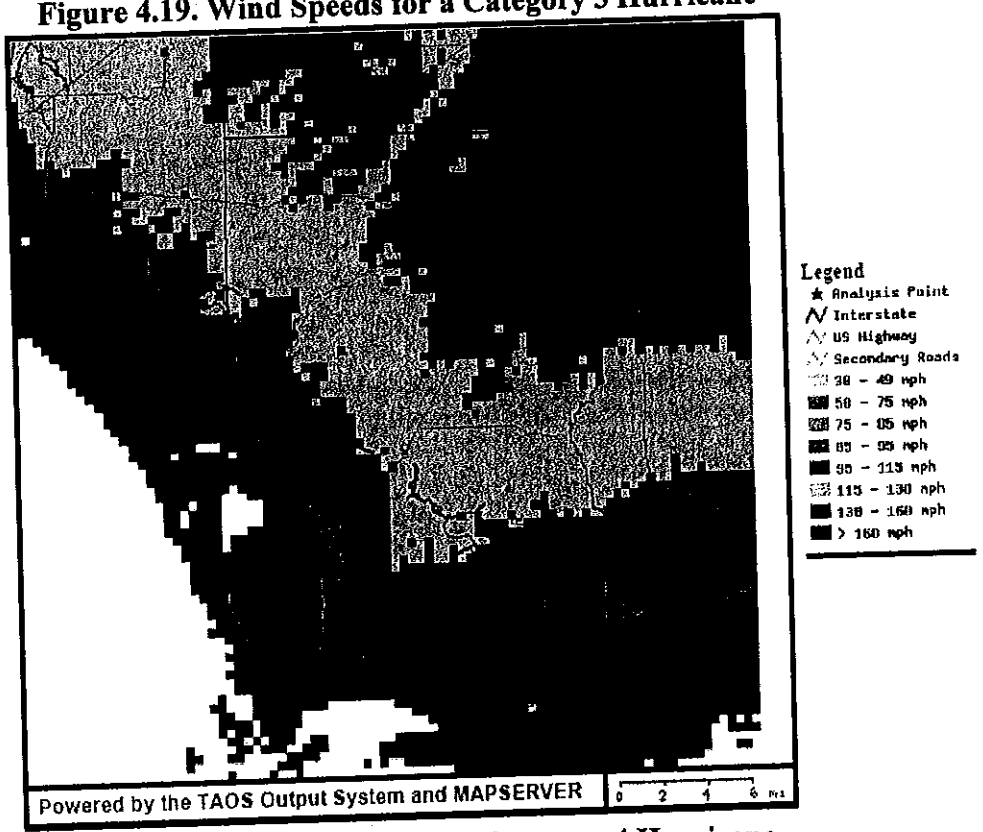


Figure 4.20. Wind Speeds for a Category 4 Hurricane

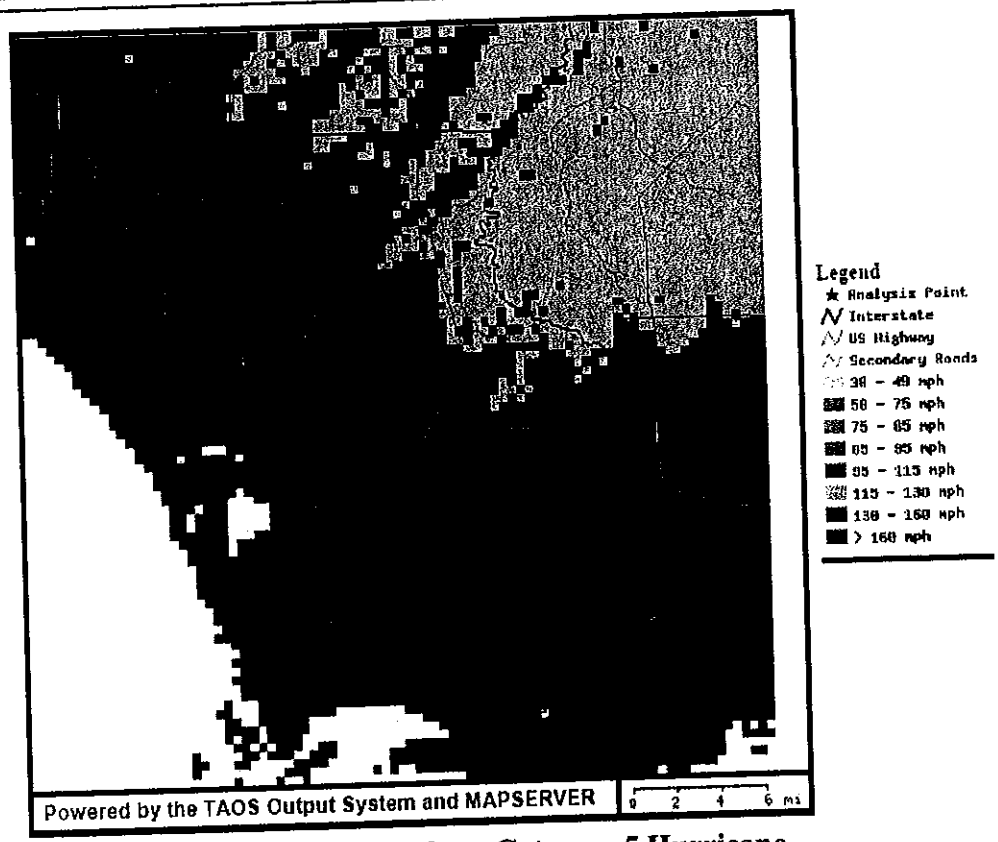


Figure 4.21. Wind Speeds for a Category 5 Hurricane

Hazard Score: 36

Potential Dollar Losses: *Table 4.16* that depicts cumulative wind, wave, and flood damages to both structures and contents from storms of varying intensity. Using tax assessor data, the MEMPHIS model allocated damage to structures and property in a variety of categories including single and multi-family, mobile homes, commercial and properties, and government buildings, among others. There are several items of interest to note from this table. First, because of the proximity of much of the development in Gulf County to the coast, even a relatively weak hurricane has the potential to cause a tremendous amount of structural and property damage in a worst-case scenario. For example, the model predicts that a worst-case Category 1 storm could potentially cause in excess of $342 million in damage. Second, as the intensity of storm increases, the dollar amount of damage rises dramatically. A Category 4 or 5 event, though extremely rare, could result in between $1.3 and $1.4 billion in damage.

Table 4.16. Potential Losses from High Winds

Tornado

Risk Level	Population	Structures	Potential Dollar Value
Gulf County (unincorporated)			
Very low risk	7,282	4,493	$334,235,392
Low risk	7,394	2,088	$166,587,456
Port St. Joe			
Very low risk	8,312	1,790	$123,128,704
Wewahitchka			
Low risk	3,665	691	$31,985,284

Category 1 Hurricane

Damage Level	Population	Structures	Potential Dollar Value
Gulf County (unincorporated)			
Light damage (<10%)	14,676	1,790	$123,128,704
Port St. Joe			
Light damage (<10%)	8,312	691	$31,985,284
Wewahitchka			
Light damage (<10%)	3,665	6,581	$500,822,784

Event Based Loss Estimate: $31,392,908

Category 2 Hurricane

Damage Level	Population	Structures	Potential Dollar Value
Gulf County (unincorporated)			
Light damage (<10%)	8,891	3,560	$284,509,888
Moderate damage (10-30%)	5,785	3,021	$216,312,912
Port St. Joe			
Moderate damage (10-30%)	8,312	1,790	$123,128,704
Wewahitchka			
Light damage (<10%)	3,665	691	$31,985,284

Event Based Loss Estimate: $86,465,424

Category 3 Hurricane

Damage Level	Population	Structures	Potential Dollar Value
Gulf County (unincorporated)			
Light damage (<10%)	5,417	1,024	$55,983,012
Moderate damage (10-30%)	9,259	5,139	$414,100,320
Heavy damage (30-50%)	0	418	$30,739,312
Port St. Joe			
Moderate damage (10-30%)	8,312	1,777	$122,190,648
Heavy damage (30-50%)	0	13	$938,054
Wewahitchka			
Light damage (<10%)	3,665	681	$31,664,420
Moderate damage (10-30%)	0	10	$320,862

Event Based Loss Estimate: $201,876,208

The following tables provide data showing the number of properties receiving 50 percent damage or greater from various categories of simulated storms striking Gulf County, Port St. Joe, and Wewhitchka (again, assuming worst case scenarios). This number is significant because structures receiving damage greater than 50 percent of their market value must meet current regulations regarding structure elevation, setbacks, and building codes when they are rebuilt.

Category 4 Hurricane

Damage Level	Population	Structures	Potential Dollar Value
Gulf County (unincorporated)			
Moderate damage (10-30%)	6,907	1,571	$121,709,920
Heavy damage (30-50%)	1,973	1,471	$103,986,632
Severe damage (50-80%)	5,796	3,539	$275,126,112
Port St. Joe			
Severe damage (50-80%)	8,312	1,790	$123,128,704
Wewahitchka			
Moderate damage (10-30%)	3,665	691	$31,985,284

Event Based Loss Estimate: $402,578,592

Category 5 Hurricane

Damage Level	Population	Structures	Potential Dollar Value
Gulf County (unincorporated)			
Heavy damage (30-50%)	6,907	1,399	$104,510,296
Severe damage (50-80%)	1,973	1,254	$85,787,568
Destroyed (>80%)	5,796	3,925	$310,524,928
Port St. Joe			
Destroyed (>80%)	8,312	1,790	$123,128,704
Wewahitchka			
Heavy damage (30-50%)	3,665	690	$31,965,296
Severe damage (50-80%)	0	1	$19,988

Event Based Loss Estimate: $589,045,632

Source: MEMPHIS data, 2004.

One of the key points to observe from the previous tables is the tremendous impact to the housing stock from even a relatively weak hurricane. This is especially noticeable in the damage to the large number of mobile homes throughout the county. According to the MEMPHIS model, a Category 2 hurricane could result in nearly 477 mobile homes receiving significant damage to market value. A Category 3 storm wreaks even more havoc on housing in the county; more than 2,812 homes and 1,127 mobile homes would receive significant damage. It must be reiterated that the MEMPHIS model represents a true worst-case scenario.

Tornado

Building Type	Very Low Risk	Low Risk
Gulf County (unincorporated)		
Single Family	$171,515,424 (2,848)	$28,900,716 (743)
Mobile Homes	$17,885,972 (888)	$12,913,895 (657)
Multi-family	$2,534,353 (60)	$0 (0)
Hotels	$649,329 (10)	$0 (0)
Commercial	$4,896,301 (132)	$1,700,361 (64)
Industrial	$1,997,654 (24)	$265,952 (2)
Government	$9,182,761 (51)	$24,088,340 (8)
Port St. Joe		
Single Family	$74,700,472 (1,450)	$0 (0)
Mobile Homes	$943,868 (61)	$0 (0)
Multi-family	$0 (0)	$0 (0)
Hotels	$346,435 (3)	$0 (0)
Commercial	$11,421,404 (152)	$0 (0)
Industrial	$10,407,539 (35)	$0 (0)
Government	$8,308,174 (19)	$0 (0)
Wewahitchka		
Single Family	$0 (0)	$16,763,856 (365)
Mobile Homes	$0 (0)	$3,511,729 (197)
Multi-family	$0 (0)	$826,023 (26)
Hotels	$0 (0)	$0 (0)
Commercial	$0 (0)	$2,837,276 (45)
Industrial	$0 (0)	$82,964 (2)
Government	$0 (0)	$3,894,446 (11)

Category 1 Hurricane

Building Type	Light Damage (<10%)
Gulf County (unincorporated)	
Single Family	$200,416,096 (3,591)
Mobile Homes	$30,799,868 (1,545)
Multi-family	$2,534,353 (60)
Hotels	$649,329 (10)
Commercial	$6,852,900 (197)
Industrial	$2,263,607 (26)
Government	$33,271,105 (59)
Port St. Joe	
Single Family	$74,700,472 (1,450)
Mobile Homes	$943,868 (61)
Multi-family	$0 (0)
Hotels	$346,435 (3)
Commercial	$11,421,404 (150)
Industrial	$10,407,539 (35)
Government	$8,308,174 (19)
Wewahitchka	
Single Family	$16,763,856 (365)
Mobile Homes	$3,511,729 (197)
Multi-family	$826,023 (26)
Hotels	$0 (0)
Commercial	$2,837,276 (46)
Industrial	$82,964 (2)
Government	$3,894,446 (11)

Category 2 Hurricane

Building Type	Light Damage (<10%)	Moderate Damage (10-30%)
Gulf County (unincorporated)		
Single Family	$51,552,088 (1,458)	$148,864,032 (2,133)
Mobile Homes	$20,239,870 (1,068)	$10,559,992 (477)
Multi-family	$1,271,764 (9)	$1,262,588 (51)
Hotels	$33,717 (2)	$615,611 (8)
Commercial	$2,179,195 (81)	$4,673,700 (116)
Industrial	$320,582 (4)	$1,943,025 (22)
Government	$26,485,317 (39)	$6,785,783 (20)
Port St. Joe		
Single Family	$0 (0)	$74,700,472 (1,450)
Mobile Homes	$0 (0)	$943,868 (61)
Multi-family	$0 (0)	$0 (0)
Hotels	$0 (0)	$346,435 (3)
Commercial	$0 (0)	$11,367,674 (152)
Industrial	$0 (0)	$10,407,539 (35)
Government	$0 (0)	$8,308,174 (19)
Wewahitchka		
Single Family	$16,763,856 (365)	$0 (0)
Mobile Homes	$3,511,729 (197)	$0 (0)
Multi-family	$826,023 (26)	$0 (0)
Hotels	$0 (0)	$0 (0)
Commercial	$2,839,276 (45)	$0 (0)
Industrial	$82,964 (2)	$0 (0)
Government	$3,894,446 (11)	$0 (0)

Category 3 Hurricane

Building Type	Light Damage (<10%)	Moderate Damage (10-30%)	Heavy Damage (30-50%)
Gulf County (unincorporated)			
Single Family	$17,098,154 (437)	$155,893,600 (2,812)	$27,424,156 (342)
Mobile Homes	$8,128,486 (378)	$21,772,720 (1,127)	$898,655 (40)
Multi-family	$0 (0)	$2,534,353 (60)	$1,168,282 (14)
Hotels	$0 (0)	$649,329 (10)	$0 (0)
Commercial	$1,100,244 (43)	$5,208,294 (137)	$544,357 (16)
Industrial	$11,482 (1)	$2,252,125 (25)	$0 (0)
Government	$156,116 (4)	$33,079,693 (54)	$35,294 (1)
Port St. Joe			
Single Family	$0 (0)	$74,349,352 (1,444)	$351,112 (6)
Mobile Homes	$0 (0)	$943,868 (61)	$0 (0)
Multi-family	$0 (0)	$0 (0)	$0 (0)
Hotels	$0 (0)	$346,435 (3)	$0 (0)
Commercial	$0 (0)	$11,393,745 (151)	$27,658 (1)
Industrial	$0 (0)	$10,407,539 (35)	$0 (0)
Government	$0 (0)	$7,939,010 (17)	$369,164 (2)
Wewahitchka			
Single Family	$16,463,464 (356)	$300,391 (9)	$0 (0)
Mobile Homes	$3,511,729 (197)	$0 (0)	$0 (0)
Multi-family	$826,023 (26)	$0 (0)	$0 (0)
Hotels	$0 (0)	$0 (0)	$0 (0)
Commercial	$2,783,276 (45)	$0 (0)	$0 (0)
Industrial	$82,964 (2)	$0 (0)	$0 (0)
Government	$3,894,446 (11)	$0 (0)	$0 (0)

Category 4 Hurricane

Building Type	Moderate Damage (10-30%)	Heavy Damage (30-50%)	Severe Damage (50-80%)
Gulf County (unincorporated)			
Single Family	$22,086,284 (607)	$20,492,914 (596)	$157,836,832 (2,388)
Mobile Homes	$10,280,948 (525)	$8,644,532 (465)	$11,874,379 (555)
Multi-family	$0 (0)	$0 (0)	$2.534,353 (60)
Hotels	$0 (0)	$33,717 (8)	$615,611 (8)
Commercial	$1,700,361 (64)	$279,623 (10)	$4,672,113 (123)
Industrial	$11,482 (1)	$307,082 (2)	$1,945,013 (23)
Government	$24,088,340 (8)	$971,940 (10)	$8,210,819 (41)
Port St. Joe			
Single Family	$0 (0)	$0 (0)	$74,700,472 (1,450)
Mobile Homes	$0 (0)	$0 (0)	$943,868 (61)
Multi-family	$0 (0)	$0 (0)	$0 (0)
Hotels	$0 (0)	$0 (0)	$346,435 (3)
Commercial	$0 (0)	$0 (0)	$11,421,404 (152)
Industrial	$0 (0)	$0 (0)	$10,407,539 (35)
Government	$0 (0)	$0 (0)	$8,308,174 (19)
Wewahitchka			
Single Family	$16,763,856 (365)	$0 (0)	$0 (0)
Mobile Homes	$3,511,729 (197)	$0 (0)	$0 (0)
Multi-family	$826,023 (26)	$0 (0)	$0 (0)
Hotels	$0 (0)	$0 (0)	$0 (0)
Commercial	$2,837,276 (45)	$0 (0)	$0 (0)
Industrial	$82,964 (2)	$0 (0)	$0 (0)
Government	$3,894,446 (11)	$0 (0)	$0 (0)

Category 5 Hurricane

Building Type	Heavy Damage (30-50%)	Severe Damage (50-80%)	Destroyed (over 80%)
Gulf County (unincorporated)			
Single Family	$20,240,850 (546)	$14,318,867 (464)	$165,856,384 (2,578)
Mobile Homes	$8,982,011 (457)	$7,649,221 (431)	$14,168,638 (657)
Multi-family	$0 (0)	$0 (0)	$2,534,353 (60)
Hotels	$0 (0)	$33,717 (2)	$615,611 (8)
Commercial	$1,700,361 (64)	$279,623 (10)	$4,672,113 (123)
Industrial	$11,482 (1)	$307,082 (2)	$1,945,013 (23)
Government	$24,088,340 (8)	$971,940 (10)	$8,210,819 (41)
Port St. Joe			
Single Family	$0 (0)	$0 (0)	$74,700,472 (1,450)
Mobile Homes	$0 (0)	$0 (0)	$943,868 (61)
Multi-family	$0 (0)	$0 (0)	$0 (0)
Hotels	$0 (0)	$0 (0)	$346,435 (3)
Commercial	$0 (0)	$0 (0)	$11,421,404 (152)
Industrial	$0 (0)	$0 (0)	$10,407,539 (35)
Government	$0 (0)	$0 (0)	$8,308,174 (19)
Wewahitchka			
Single Family	$16,743,868 (364)	$19,988 (1)	$0 (0)
Mobile Homes	$3,511,729 (197)	$0 (0)	$0 (0)
Multi-family	$826,023 (26)	$0 (0)	$0 (0)
Hotels	$0 (0)	$0 (0)	$0 (0)
Commercial	$2,837,276 (45)	$0 (0)	$0 (0)
Industrial	$82,964 (2)	$0 (0)	$0 (0)
Government	$3,894,446 (11)	$0 (0)	$0 (0)

Source: MEMPHIS data, 2004.
Note: The numbers in parentheses indicate the number of structures vulnerable to the hazards in each category

Infestation/Disease

Definition: Infestation is the state of being invaded or overrun by something. In hazard mitigation, infestation usually refers to parasites, insects, or rodents. Typically, disease is linked to infestation because "pests" that overrun an area carry disease with them, infecting plants, animals, and humans.[10]

Task Force Comments: The primary sources of infestation and disease in Gulf County are Southern Pine Beetle infestation, Red Tide, and mosquito related infections. Annually, the Southern Pine Beetle destroys portions of the pine forests in Gulf County. According to the Florida Division of Forestry, it is unlikely that an area-wide breakout will occur in most of Gulf County. However, Southern Pine Beetles present a moderate risk to the eastern portion of the County. *Figure 4.22* shows the Southern Pine Beetle hazard rating for various parts of Gulf County.

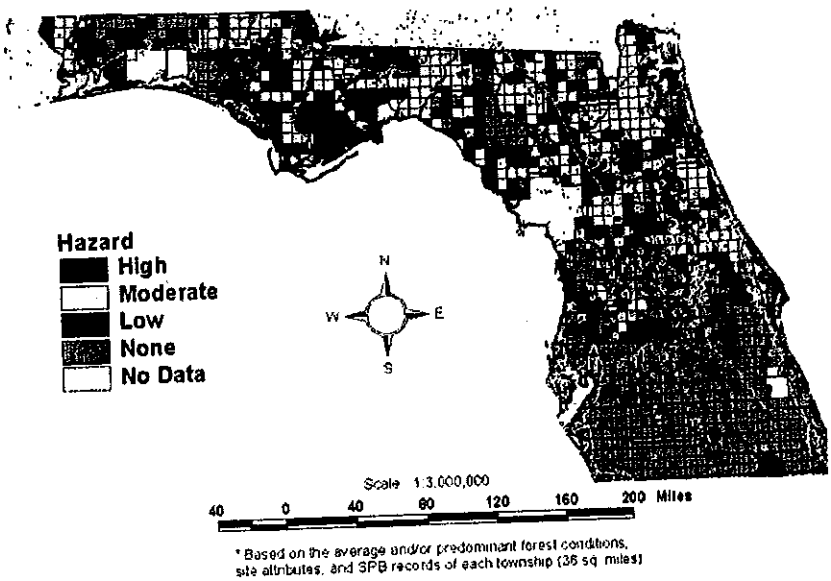


Figure 4.22. Southern Pine Beetle Hazard Rating Map, 2002
Source: Florida Division of Forestry website.
http://www.fl-dof.com/Conservation/forest_health/SPB2002/HazardRatingMap.htm

Red tide refers to a bloom of harmful microorganisms that color the water while releasing toxins. Because of the tremendous fish and marine life kills, red tide consistently poses a threat to Gulf County's seafood industry. The mosquito related infections tracked in Gulf County have included West Nile Virus and Eastern equine encephalitis/meningitis. Cases of both of these viruses have occurred in recent years. One death occurred in 2003 from the West Nile that originated in Gulf County.

Hazard Score: 35

Potential Dollar Losses: There was insufficient information to generate an estimate of potential dollar losses resulting from infestation and disease. Potential losses will be estimated as more

[10] Online Dictionary. http://www.thefreedictionary.com/

information and technology becomes available. This capability will be reassessed each planning cycle.

Landslide, Erosion

Definition: Debris flows, sometimes referred to as mudslides, mudflows, lahars, or debris avalanches, are common types of fast-moving landslides. These flows generally occur during periods of intense rainfall or rapid snowmelt.[11] Coastal erosion is the landward displacement of the shoreline caused by the forces of waves and currents.[12]

Task Force Comments: Significant damages are also caused by coastal erosion that can result in severe changes to coastline contours and dune structure. Areas of problem erosion in Gulf County are the St. Joseph Peninsula and Indian Pass, both of which are areas used for private residences as well as public recreation. Coastal erosion is especially critical in the Stump Hole area of Cape San Blas. If the County were to consider acquiring coastal property, these areas could serve multiple purposes of conservation, beach access, and mitigation (to prevent development in areas prone to erosion and loss). The map on the following page identifies areas of critical erosion in Gulf County. The Florida Department of Environmental Protection's Bureau of Beaches and Coastal Systems has described Gulf County's beach erosion problems as follows:

> There are three critical erosion areas (4-3 miles) and four noncritical erosion areas (13.3 miles) in Gulf County. A 0.8-mile mainland segment (RI-R5) is designated as critical due to Hurricane Earl. Most of St. Joseph Peninsula is eroding between R41 and RI 14 at Cape San Bias. Two areas are considered critical due to threatened development or lost wildlife habitat. The northern half of St. Joseph Peninsula (R41-R83) has noncritical erosion for 8.3 miles and a middle segment (R85R95.5) is still considered noncritical for 1.9 miles.
>
> A central segment (R83-R85) of critical erosion on St. Joseph Peninsula extends for 0.4 mile and threatens private development. A longer segment (R95.5-RIII.5) extends for 3.1 miles and threatens private development as well as the County Road C31 at Stump Hole. South of Stump Hole to the threatened and damaged U.S. Air Force facilities, the erosion has destroyed nesting sea turtle habitat. Since Hurricane Opal, a rock mound structure has been constructed to protect the county road at Stump Hole; however, the U.S. Air Force constructed a rock mound structure in front of their road to the rocket launch site after Hurricane Kate in 1985 and both the road and the rock mound structure were destroyed by Hurricane Opal in 1995.
>
> South of the Air Force facilities Cape San Blas (111.5-RI14) suffers severe but noncritical erosion for 0.5 mile. Indian Peninsula (RI 50-RI 62) at the east end of the county is also eroding for 2.8 miles with no threatened interests at this time.

[11] Federal Emergency Management Agency website. http://www.fema.gov/hazards/landslides/whatis.shtm
[12] European Environment Agency website. http://glossary.eea.eu.int/EEAGlossary/C/coastal_erosion

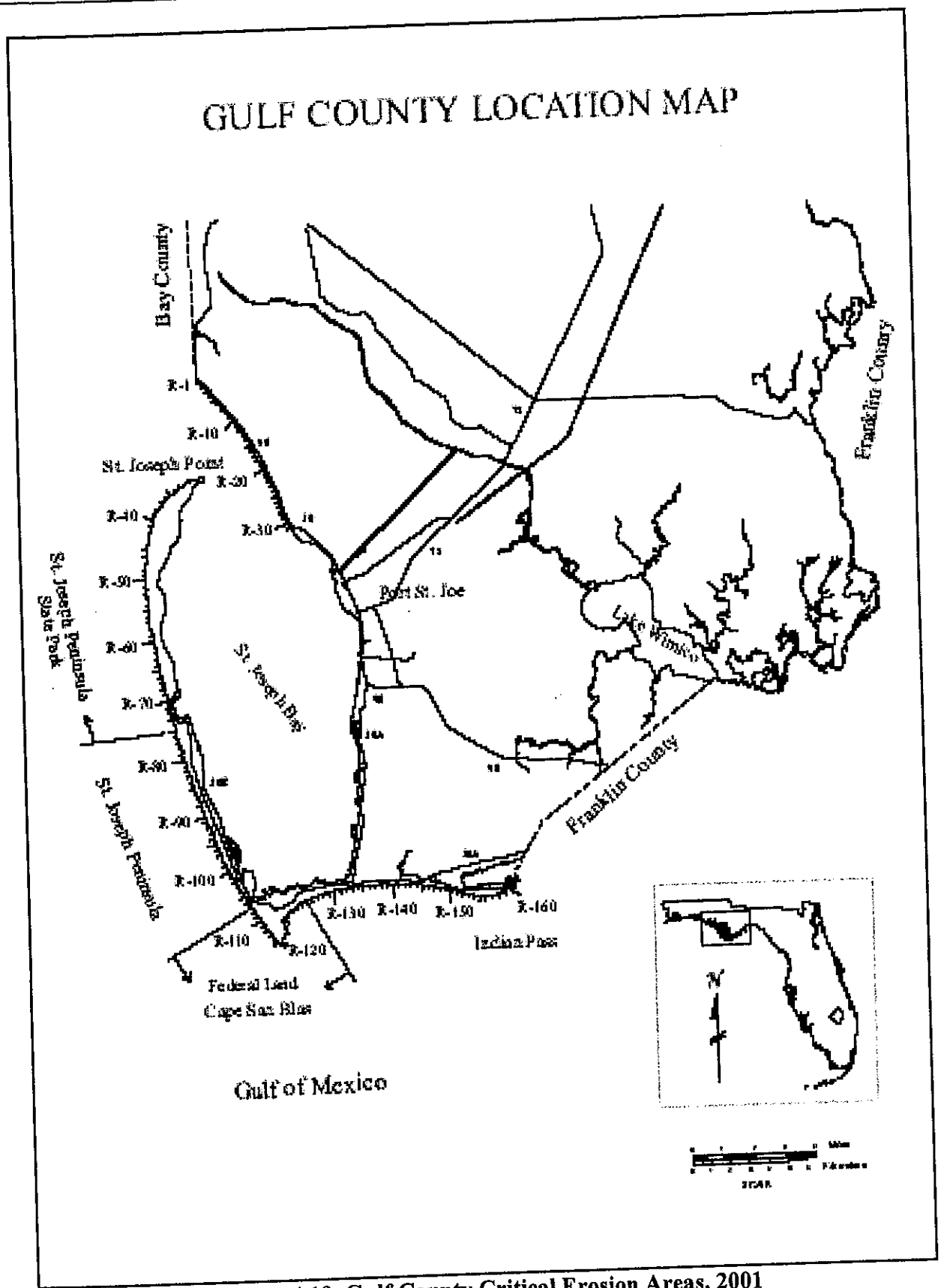


Figure 4.19. Gulf County Critical Erosion Areas, 2001
Source: Bureau of Beaches and Coastal Systems, Florida Department of Environmental Protection

Hazard Score: 40

Potential Dollar Losses: There was insufficient information to generate an estimate of potential dollar losses resulting from landslide and erosion. Potential losses will be estimated as more information and technology becomes available. This capability will be reassessed each planning cycle.

Lightning

Definition: Lightning is an electrical discharge that results from the buildup of positive and negative charges within a thunderstorm. When the buildup becomes strong enough, lightning appears as a "bolt." This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning reaches a temperature approaching 50,000 degrees Fahrenheit in a split second. [13]

Task Force Comments: Lightning resulting from thunderstorms is common in Gulf County. However, lightning rarely causes significant property damage. *Figure 4.24* shows the lightning damage risk assessment based upon the corresponding thunderstorm damage.

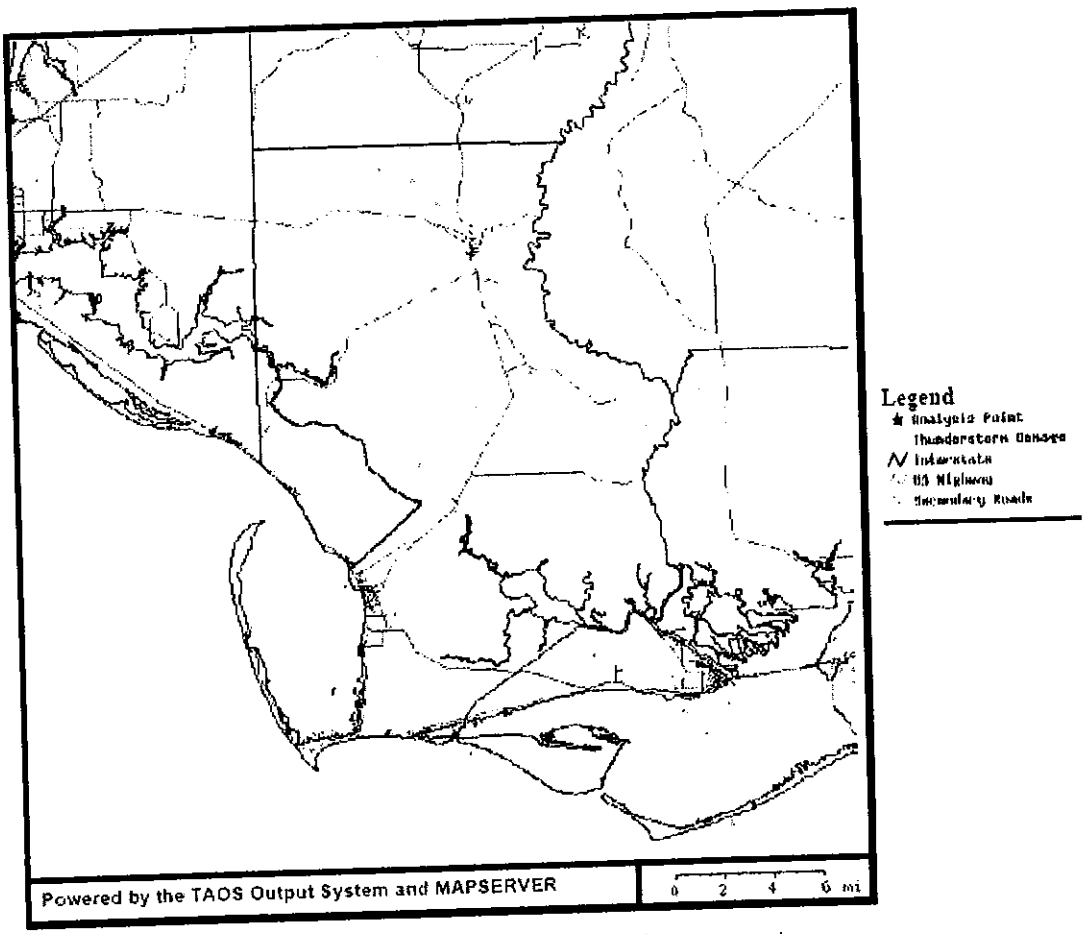


Figure 4.24. Lightning Damage Risk Assessment

Hazard Score: 25

Potential Dollar Losses: There was insufficient information to generate an estimate of potential dollar losses resulting from lightning. Potential losses will be estimated as more information and technology becomes available. This capability will be reassessed each planning cycle.

[13] Federal Emergency Management Agency. http://www.fema.gov/hazards/thunderstorms/thunder.shtm

Storm Surge, Tsunami

Definition: An abnormal rise in sea level accompanying a hurricane or other intense storm, and whose height is the difference between the observed level of the sea surface and the level that would have occurred in the absence of the cyclone. Storm surge is usually estimated by subtracting the normal or astronomic high tide from the observed storm tide. Note: waves on top of the storm surge will create an even greater high-water mark.

Tropical cyclones are classified as follows:

Tropical Depression - An organized system of clouds and thunderstorms with a defined circulation and maximum sustained winds of 38 mph (33 knots) or less.

Tropical Storm - An organized system of strong thunderstorms with a defined circulation and maximum sustained winds of 39 to 73 mph (34-63 knots).

Hurricane - An intense tropical weather system with a well-defined circulation and maximum sustained winds of 74 mph (64 knots) or higher. Hurricanes are called "typhoons" in the western Pacific, while similar storms in the Indian Ocean are called "cyclones." [14]

Task Force Comments: *Figures 4.25, 4.26, 4.27, 4.28,* and *4.29* show the storm surge area and wave heights for hurricanes of Categories 1 through 5.

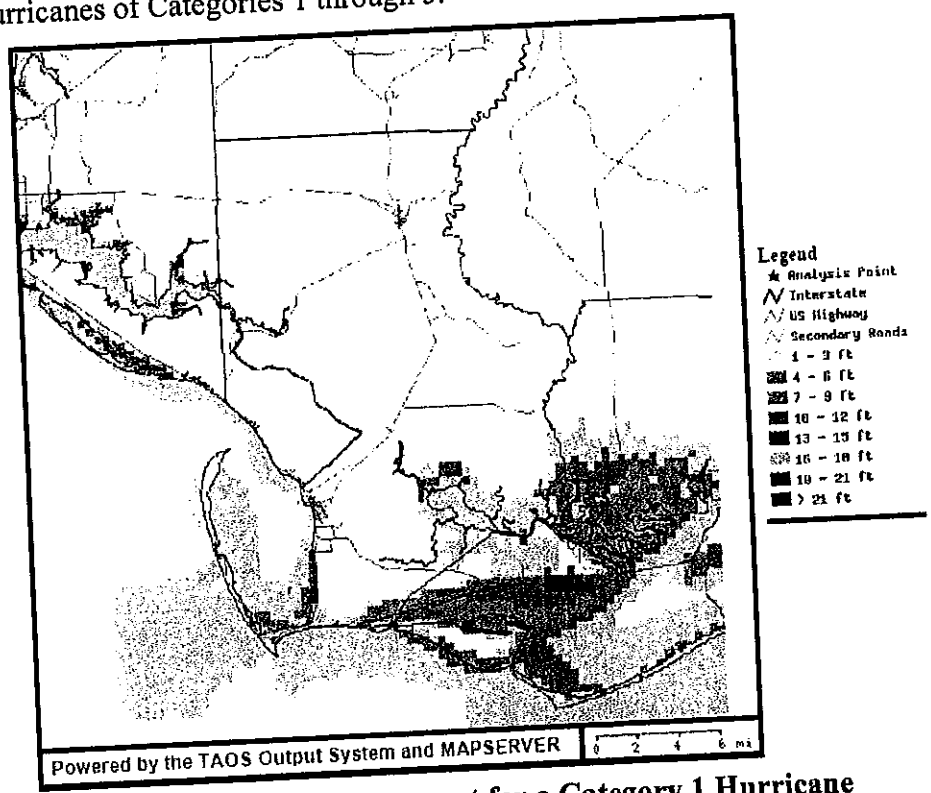


Figure 4.25. Storm Surge Assessment for a Category 1 Hurricane

[14] Federal Emergency Management Agency website. http://www.fema.gov/hazards/hurricanes/whatis.shtm

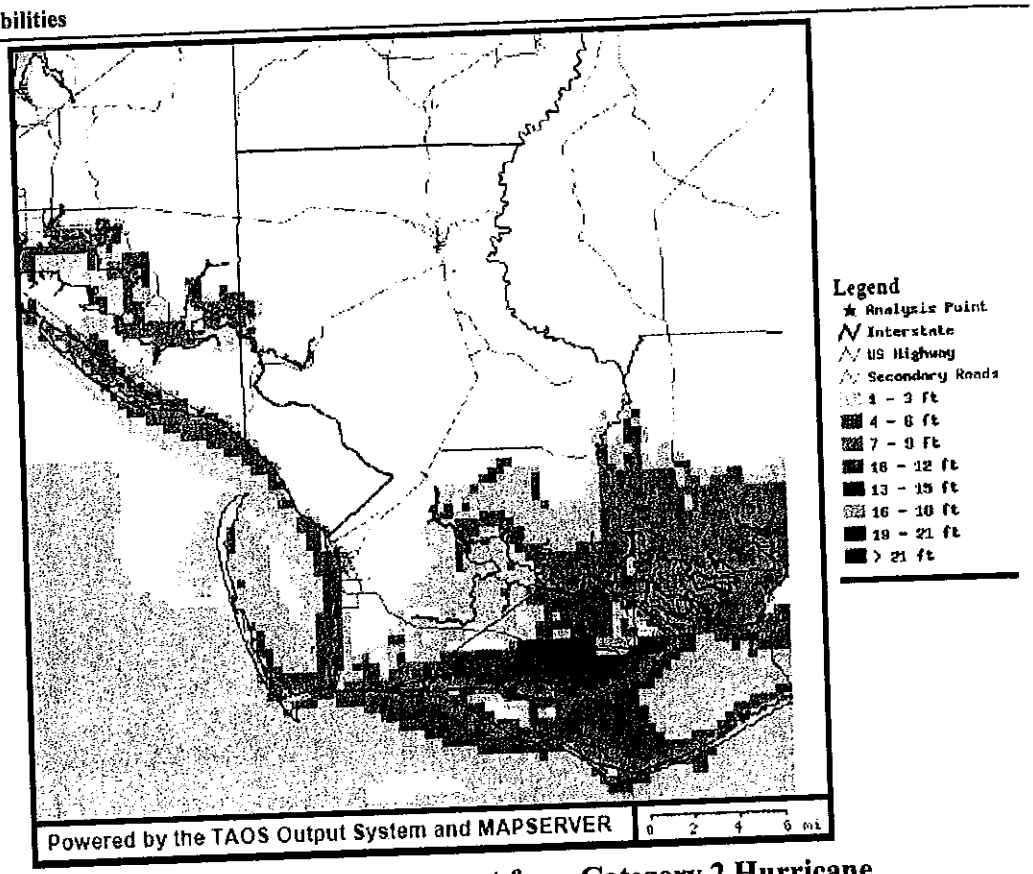


Figure 4.26. Storm Surge Assessment for a Category 2 Hurricane

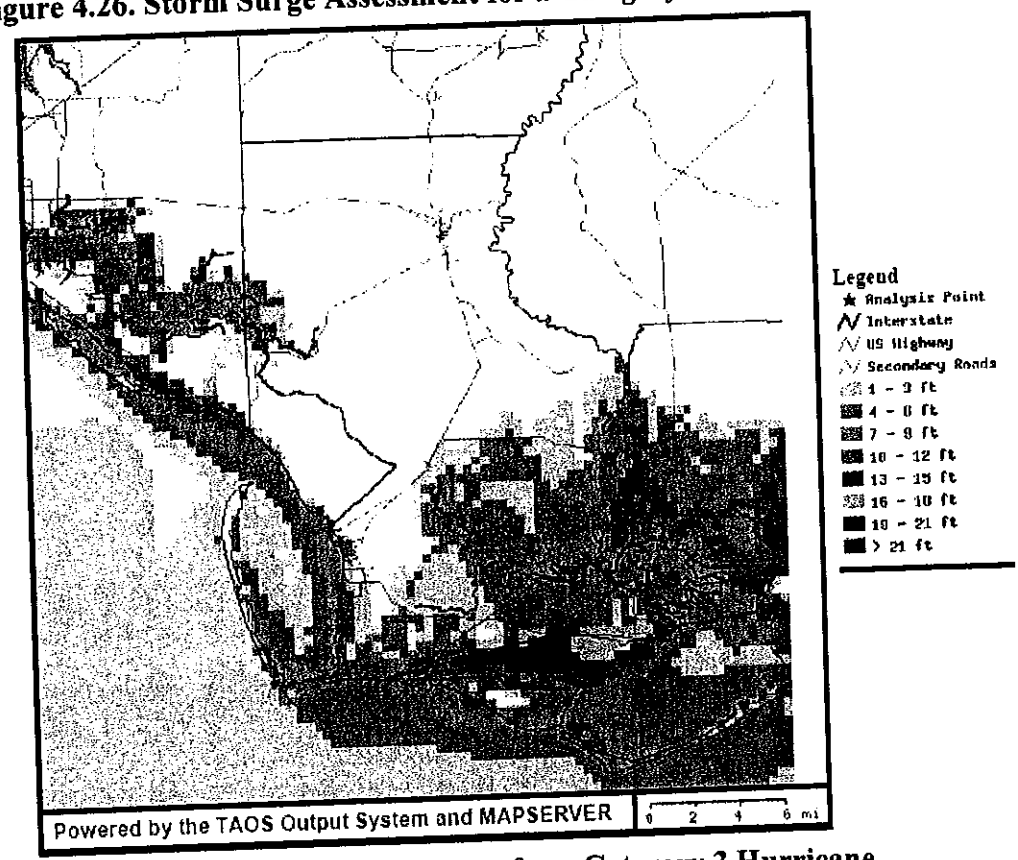


Figure 4.27. Storm Surge Assessment for a Category 3 Hurricane

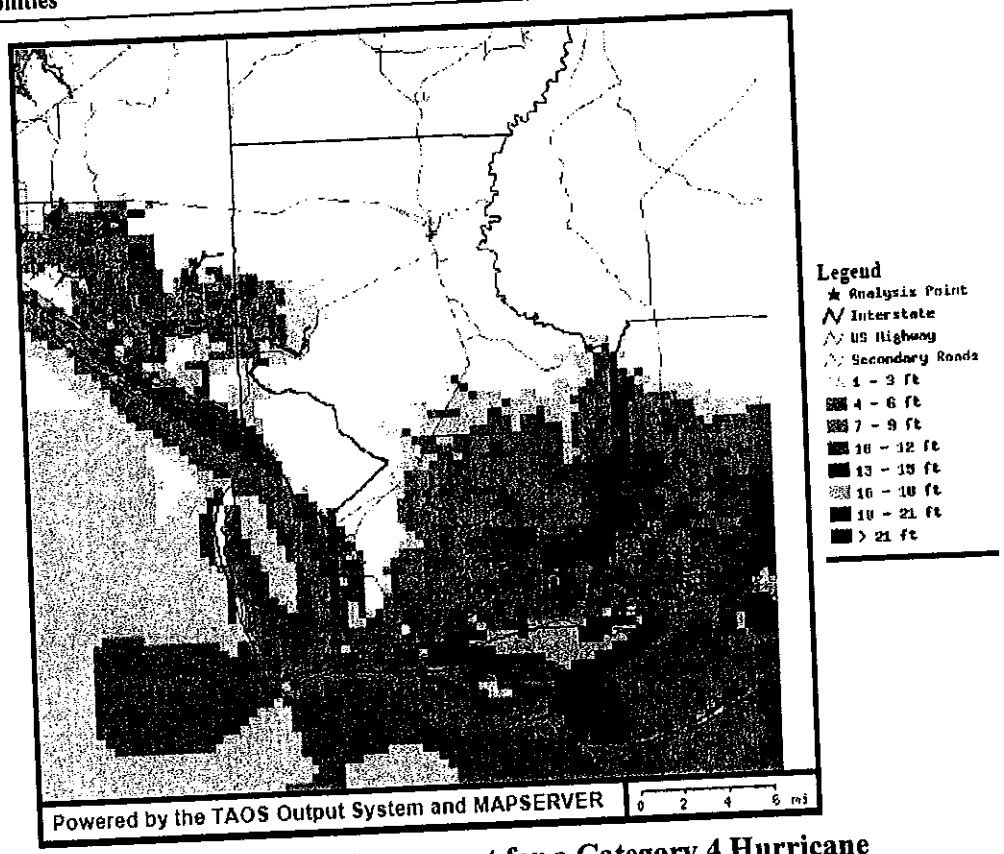


Figure 4.28. Storm Surge Assessment for a Category 4 Hurricane

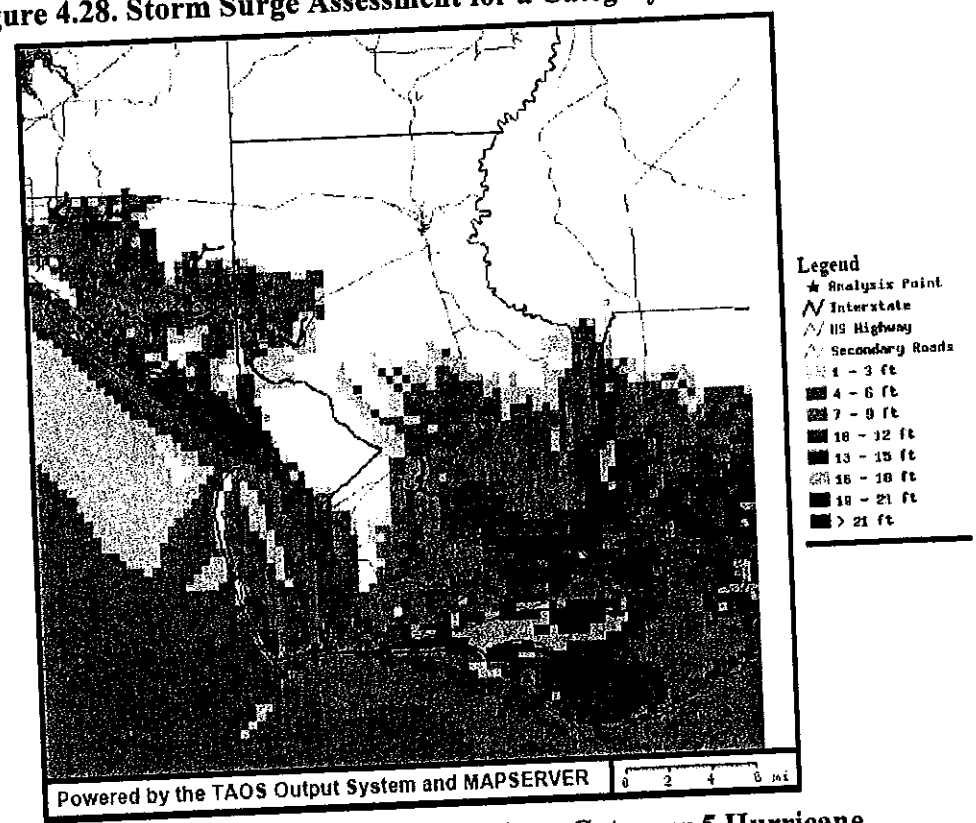


Figure 4.29. Storm Surge Assessment for a Category 5 Hurricane

Hazard Score: 40

Potential Dollar Losses: *Table 4.17* shows the potential dollar losses from storm surge wave and current according to MEMPHIS data.

Table 4.17. Potential Losses from Storm Surge

Intensity	Population	Structures	Potential Dollar Value
Gulf County (unincorporated)			
Category 1	0	0	$0
Category 2	1,102	153	$11,212,061
Category 3	1,102	530	$39,683,524
Category 4	1,707	1,203	$80,485,584
Category 5	1,824	1,405	$96,556,808
Port St. Joe			
Category 1	0	0	$0
Category 2	0	138	$11,198,173
Category 3	0	546	$51,491,628
Category 4	3,694	1,378	$99,345,696
Category 5	3,694	1,328	$97,125,520
Wewahitchka			
Category 1	0	0	$0
Category 2	0	0	$0
Category 3	0	0	$0
Category 4	0	0	$0
Category 5	0	0	$0

Source: MEMPHIS data, 2004.

Building Type	Category 1	Category 2	Category 3	Category 4	Category 5
Gulf County (unincorporated)					
Single Family	$0 (0)	$6,967,975 (99)	$27,199,534 (390)	$50,714,384 (816)	$56,087,752 (931)
Mobile Homes	$0 (0)	$474,202 (26)	$1,235,034 (64)	$4,513,606 (234)	$5,129,133 (284)
Multi-family	$0 (0)	$0 (0)	$0 (0)	$0 (0)	$0 (0)
Hotels	$0 (0)	$258,470 (3)	$258,470 (3)	$330,788 (5)	$330,788 (5)
Commercial	$0 (0)	$813,070 (11)	$1,499,974 (36)	$2,746,730 (57)	$2,881,023 (59)
Industrial	$0 (0)	$1,121,696 (8)	$1,370,225 (7)	$1,503,143 (9)	$1,163,143 (9)
Government	$0 (0)	$506,470 (1)	$2,756,939 (4)	$5,916,667 (10)	$5,838,867 (10)
Port St. Joe					
Single Family	$0 (0)	$6,869,971 (113)	$27,615,852 (435)	$58,882,984 (1,102)	$56,969,600 (1,058)
Mobile Homes	$0 (0)	$48,978 (3)	$193,370 (18)	$668,727 (50)	$639,301 (47)
Multi-family	$0 (0)	$0 (0)	$0 (0)	$0 (0)	$0 (0)
Hotels	$0 (0)	$0 (0)	$96,705 (1)	$96,705 (1)	$96,705 (1)
Commercial	$0 (0)	$1,617,257 (14)	$4,666,098 (52)	$7,915,205 (126)	$8,837,852 (123)
Industrial	$0 (0)	$0 (0)	$8,639,647 (4)	$10,192,657 (30)	$10,192,657 (30)
Government	$0 (0)	$3,529 (1)	$3,108,409 (10)	$7,601,468 (15)	$7,601,468 (15)
Wewahitchka					
Single Family	$0 (0)	$0 (0)	$0 (0)	$0 (0)	$0 (0)
Mobile Homes	$0 (0)	$0 (0)	$0 (0)	$0 (0)	$0 (0)
Multi-family	$0 (0)	$0 (0)	$0 (0)	$0 (0)	$0 (0)
Hotels	$0 (0)	$0 (0)	$0 (0)	$0 (0)	$0 (0)
Commercial	$0 (0)	$0 (0)	$0 (0)	$0 (0)	$0 (0)
Industrial	$0 (0)	$0 (0)	$0 (0)	$0 (0)	$0 (0)
Government	$0 (0)	$0 (0)	$0 (0)	$0 (0)	$0 (0)

Source: MEMPHIS data, 2004.
Note: The numbers in parentheses indicate the number of structures vulnerable to the hazards in each category

Subsidence, Expansive soils

Definition: Land subsidence occurs when large amounts of ground water have been withdrawn from certain types of rocks, such as fine-grained sediments. Sinkholes are common where the rock below the land surface is limestone, carbonate rock, salt beds, or rocks that can naturally be dissolved by ground water circulating through them. As the rock dissolves, spaces and caverns develop underground.[15]

Task Force Comments: Although sinkholes are commonplace in Florida, Gulf County has a relatively low sinkhole potential. According to the Florida Department of Environmental, the area has "very few sinkhole occurrence, although several large diameter, deep sinkholes are present in the area."[16] However, there is some potential of sinkhole occurrence and land subsidence in the eastern half of the County because of the karst topography and soils. *Figure 4.30 s*hows the location of previous sinkholes in Gulf County.

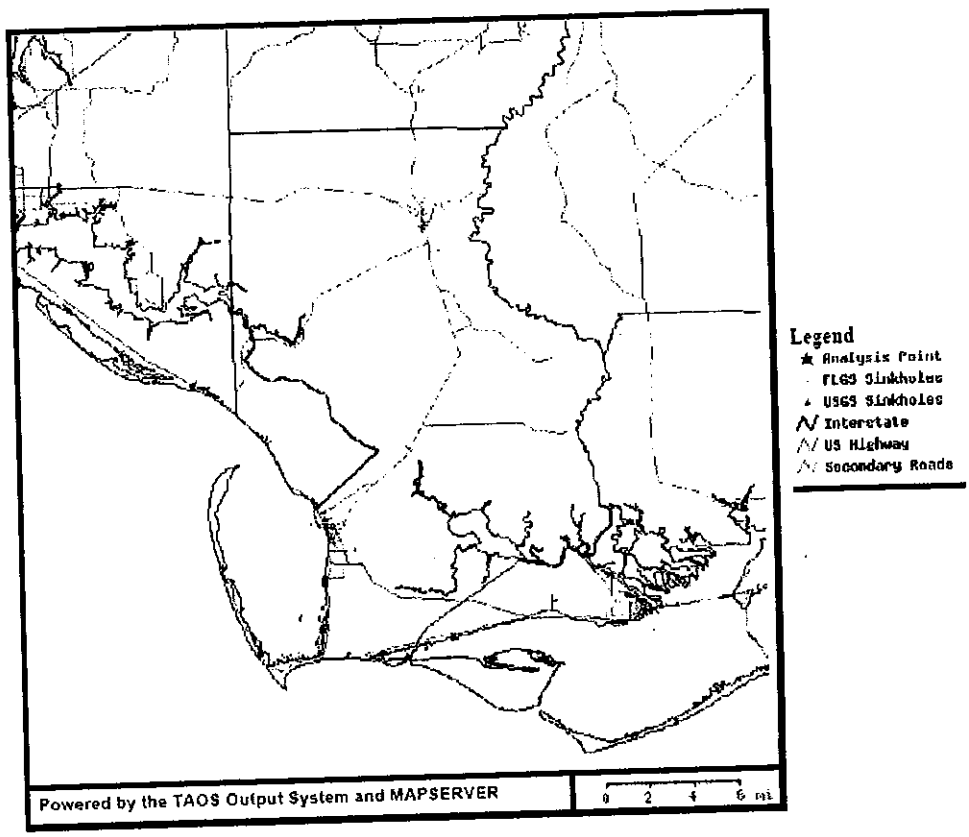


Figure 4.26. Sinkhole Risk Assessment

Hazard Score: 3

Potential Dollar Losses: Approximately 7,568 buildings are located in the very low or low sinkhole potential zones with a total value of $645,826,726. Actual losses are about $300 per

[15] United States Geological Survey. http://ga.water.usgs.gov/edu/earthgwsinkholes.html
[16] Florida Department of Environmental Protection website.
http://www.dep.state.fl.us/geology/geologictopics/sinkholedevelopment.htm

year. *Table 4.18* shows a breakdown of potential damage and loss of life by jurisdiction and level of risk.

Table 4.18. Potential Losses from Subsidence and Expansive Soils

Risk Level	Population	Structures	Potential Dollar Value
Gulf County (unincorporated)			
Very low risk	14,676	6,480	$500,822,784
Port St. Joe			
Very low risk	8,312	1,790	$123,128,704
Wewahitchka			
Very low risk	3,665	691	$31,985,284

Building Type	Very Low Risk
Gulf County (unincorporated)	
Single Family	$200,416,096 (3,588)
Mobile Homes	$30,799,868 (1,545)
Multi-family	$2,534,353 (60)
Hotels	$649,329 (10)
Commercial	$6,852,900 (197)
Industrial	$2,263,607 (26)
Government	$33,271,105 (59)
Port St. Joe	
Single Family	$74,700,472 (1,450)
Mobile Homes	$943,868 (61)
Multi-family	$0 (0)
Hotels	$346,435 (3)
Commercial	$7,621,404 (170)
Industrial	$10,407,539 (35)
Government	$8,308,174 (19)
Wewahitchka	
Single Family	$16,763,856 (365)
Mobile Homes	$3,511,729 (197)
Multi-family	$826,023 (26)
Hotels	$0 (0)
Commercial	$2,821,536 (45)
Industrial	$245,696 (3)
Government	$3,894,446 (11)

Source: MEMPHIS data, 2004.
Note: The numbers in parentheses indicate the number of structures vulnerable to the hazards in each category

Urban Fire

Definition: Urban fire refers to fires that take place in urban development, high-density residential areas, central business districts/downtowns, and commercial centers. Fires can also occur on the urban interface, the area where heavily vegetated areas meet urban development. Urban fire is particularly dangerous because fire can spread quickly because of the close proximity of structures in urban areas. In addition, fires are more likely to encounter energy sources that will intensify the fire such as propane tanks, gasoline stations, and natural gas lines.

Task Force Comments: Because Gulf County's urban area is relatively small, many fires occur along the urban interface and cause significant structural damage. Although the rural population is sparse, those who live in and near the forest may be directly threatened or isolated by fire. Often the location of rural residents is not well marked and sometimes the driveway access is not large enough to accommodate fire trucks or other emergency vehicles. In the areas of the county with a rapidly growing population, there is a concern that the size and amount of new construction may exceed the existing capacities of the local fire departments. Since there were no hazard maps available for only urban fire, the city limits of the municipalities are shown on *Figure 4.31* to indicate urban and interface areas.

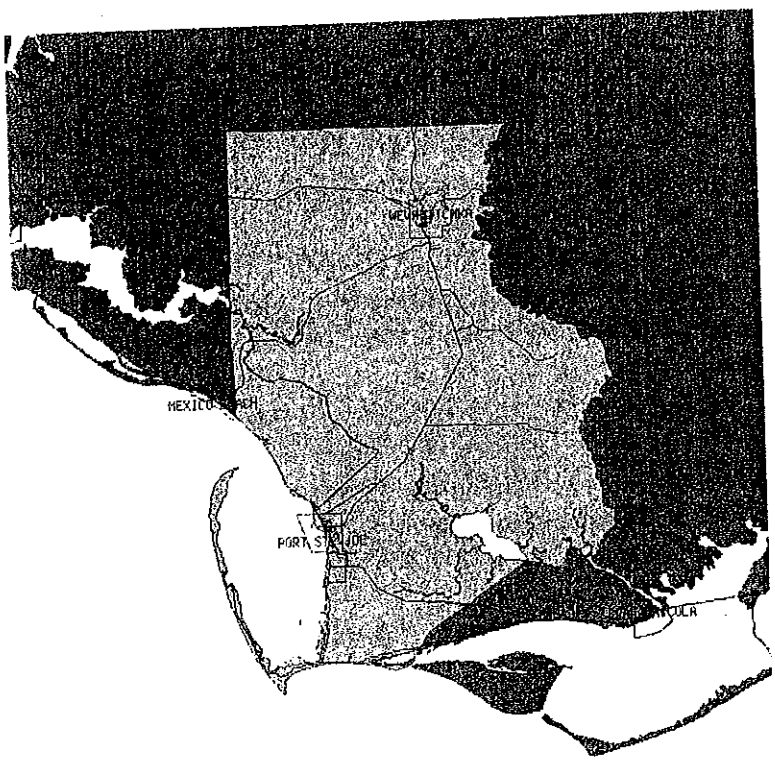


Figure 4.31. Municipality Limits

Hazard Score: 35

Potential Dollar Losses: Because the potential dollar losses associated with urban fire are included with those resulting from wildfire in the MEMPHIS model, urban fire estimates were generated by excluding potential losses to timber, crop, and agricultural land from the total potential dollar losses. *Table 4.19* shows these losses according to jurisdiction and risk level.

Table 4.19. Potential Losses from Urban Fire

Risk Level	Population	Structures	Potential Dollar Value
Gulf County (unincorporated)			
Low	975	2,030	$93,575,727
Medium	4,903	1,979	$92,650,490
High	8,798	1,693	$103,138,413
Port St. Joe			
Low	7,786	991	$57,897,114
Medium	0	723	$60,239,971
High	526	76	$4,062,263
Wewahitchka			
Low	0	387	$19,722,878
Medium	1,421	186	$6,995,150
High	2,244	118	$3,976,366

Building Type	Low	Medium	High
Gulf County (unincorporated)			
Single Family	$69,362,256 (1,257)	$72,238,072 (1,259)	$58,815,544 (1,075)
Mobile Homes	$11,184,219 (526)	$11,151,843 (536)	$8,463,810 (483)
Multi-family	$1,271,764 (9)	$1,262,588 (51)	$0 (0)
Hotels	$284,823 (3)	$364,505 (7)	$0 (0)
Commercial	$2,352,826 (73)	$2,413,766 (59)	$2,086,302 (65)
Industrial	$1,235,423 (5)	$378,449 (12)	$649,735 (14)
Government	$3,427,221 (10)	$1,345,173 (15)	$28,498,705 (34)
Port St. Joe			
Single Family	$37,683,376 (801)	$33,502,380 (586)	$3,514,686 (63)
Mobile Homes	$391,614 (29)	$521,159 (31)	$31,094 (1)
Multi-family	$0 (0)	$0 (0)	$0 (0)
Hotels	$272,117 (2)	$0 (0)	$74,317 (1)
Commercial	$7,338,386 (92)	$3,788,989 (54)	$247,329 (6)
Industrial	$1,663,893 (28)	$8,693,364 (6)	$50,282 (1)
Government	$5,254,940 (9)	$2,895,274 (8)	$83,528 (2)
Wewahitchka			
Single Family	$9,881,578 (205)	$4,149,152 (97)	$2,733,124 (63)
Mobile Homes	$1,865,763 (101)	$962,467 (56)	$683,498 (40)
Multi-family	$826,023 (26)	$0 (0)	$0 (0)
Hotels	$0 (0)	$0 (0)	$0 (0)
Commercial	$1,637,954 (25)	$760,621 (14)	$416,516 (6)
Industrial	$0 (0)	$82,964 (2)	$0 (0)
Government	$1,784,058 (6)	$453,469 (4)	$68,682 (1)

Source: MEMPHIS data, 2004.
Note: The numbers in parentheses indicate the number of structures vulnerable to the hazards in each category

Wildfire

Definition: There are three different classes of wildland fires. A surface fire is the most common type and burns along the floor of a forest, moving slowly and killing or damaging trees. A ground fire is usually started by lightning and burns on or below the forest floor. Crown fires spread rapidly by wind and move quickly by jumping along the tops of trees. [17]

Task Force Comments: The rural areas of Gulf County are heavily forested and wildfires are common. Data provided by the State Division of Forestry (*Table 4.20*) shows that from 2000 through June 2004, a significant number of acres burned in the state of Florida. Wildfires affecting commercial forest, non-commercial forest, and non-forest (agricultural) lands are included in the information presented. Commercial forests are forestlands capable of producing crops of industrial wood, regardless of stocking, and not withdrawn from timber utilization. A noncommercial forest is land that is unproductive forestland, including productive forestland withdrawn from commercial timber use. Nonforest land is any area not growing timber and devoted to non-forest uses such as crops, pasture, etc.

Table 4.20. Acres Burned by Wildfires, 2000-June 2004

Year	Number of Acres	Number of Fires
2000	210,851	6,723
2001	403,737	4,805
2002	56,835	3,065
2003	27,493	2,077
2004	36,674	1,888

Source: Florida Division of Forestry website. http://flame.fl-dof.com/General/firestat.html

The population most vulnerable to wildfires is residents living in close proximity to Gulf County's heavily wooded rural areas. The wildfires that swept throughout the state in 1998 burned many residences in areas where the urban environment intersected with large tracts of heavily wooded land. Areas of Gulf County have a similar urban/wildland interface and are vulnerable to this hazard. *Figure 4.32* shows the areas in Gulf County for which wildfire presents a low, medium, and high risk. In 2003, although lightning caused 49% of the total acres burned, excessive amounts of debris caused more than 18% of the total number of fires.[18]

[17] Federal Emergency Management Agency website. http://www.fema.gov/hazards/fires/
[18] Florida Division of Forestry website. http://flame.fl-dof.com/General/firestat.html

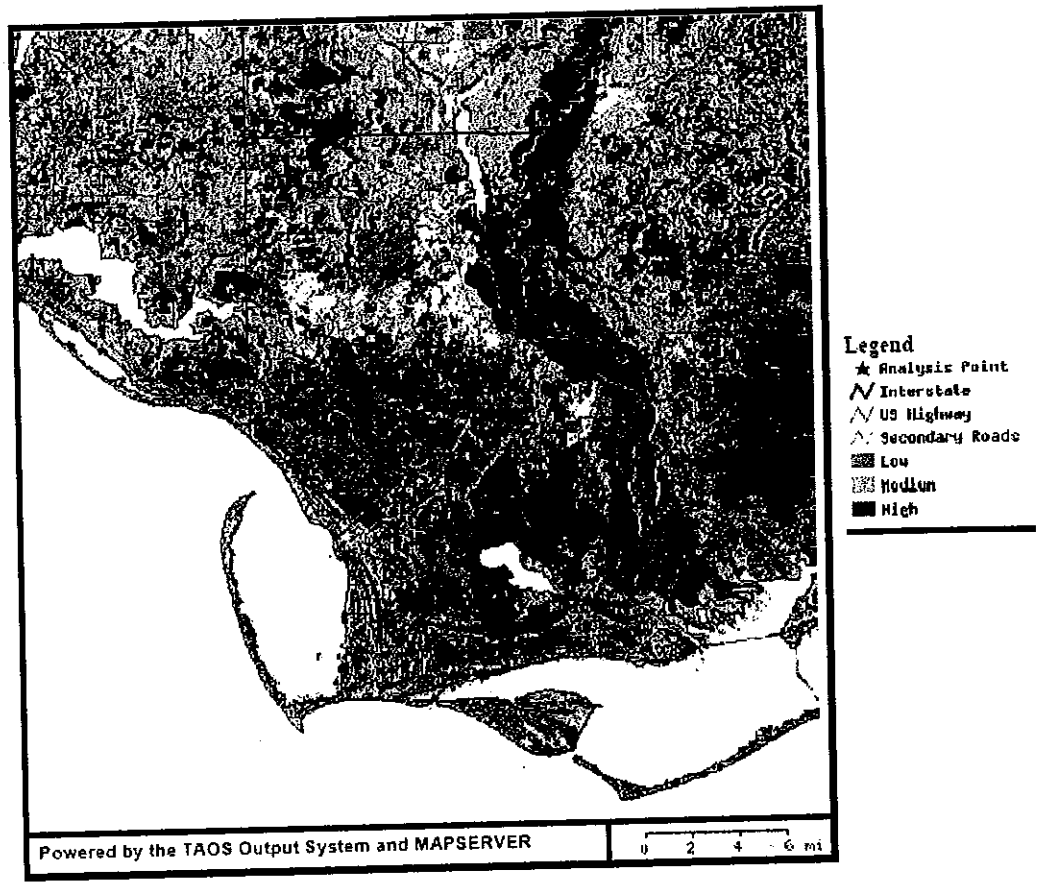


Figure 4.32. Wildfire Risk Assessment

Hazard Score: 40

Potential Dollar Losses: *Table 4.21* lists the potential dollar losses in Gulf County from wildfire.

Table 4.21. Potential Losses from Wildfire

Risk Level	Structures	Potential Dollar Value
Gulf County (unincorporated)		
Low	174	$42,736,588
Medium	230	$55,229,558
High	475	$113,491,555
Port St. Joe		
Low	6	$420,722
Medium	14	$454,981
High	1	$53,623
Wewahitchka		
Low	5	$204,128
Medium	6	$486,555
High	7	$600,201

Source: MEMPHIS data, 2004.

Winter Storm

Definition: Winter storms are extratropical storms that bring cold temperatures, precipitation, and possibly, high winds. The following conditions can occur during winter storms: snow, heavy snow, blizzard, freezing rain, sleet, freeze, frost, and wind chill.[19]

Task Force Comments: This region is generally unaccustomed to snow, ice, and freezing temperatures. Once in a while, cold air penetrates south across Florida, into the Gulf of Mexico. Temperatures fall below freezing killing tender vegetation, such as flowering plants and the citrus fruit crop. Wet snow and ice rapidly accumulate on trees with leaves, causing the branches to snap under the load. Motorists are generally unaccustomed to driving on slick roads and traffic accidents increase. Some buildings are poorly insulated or lack heat altogether. [The jurisdictions] not have available snow removal equipment or treatments, such as sand or salt, for icy roads. For winter deaths related to ice and snow about 70% occur in automobiles, while about 25% are people caught out in the storm. For winter deaths related to exposure to cold 50% are people over 60 years old, over 75% are males, and about 20% occur in the home.[20]

Hazard Score: 16

Potential Dollar Losses: There was insufficient information to generate an estimate of potential dollar losses resulting from winter storms. Potential losses will be estimated as more information and technology becomes available. This capability will be reassessed each planning cycle.

[19] University Corporation for Atmospheric Research website. http://www.meted.ucar.edu/hazwx/topic3/fact9.htm
[20] National Weather Service Website. http://www.nws.noaa.gov/om/brochures/wntrstm.htm

Volcanic Activity

FEMA Definition: A volcano is a mountain that opens downward to a reservoir of molten rock below the surface of the earth. Unlike most mountains, which are pushed up from below, volcanoes are built up by an accumulation of their own eruptive products lava, ashflows, and airborne ash and dust. When pressure from gases and the molten rock becomes strong enough to cause an explosion, eruptions occur. Gases and rock shoot up through the opening and spill over, or fill the air with lava fragments.

Task Force Comments: The only volcanoes in the United States are located in Alaska, Hawaii, and the western portion of the country. Volcanoes found in Mexico and on islands in the Caribbean Ocean are substantial distances away from Gulf County, Florida. Therefore, the United States Geological Survey asserts that volcanic activity presents little to no risk to the County and its jurisdictions.

Hazard Score: 0

Potential Dollar Losses: $0

Gas Service Loss

Definition: Gas service loss refers to the disruption of centralized natural gas service to a community's residents, including the holding facilities for natural gas, crude and refined petroleum, and petroleum-derived fuels, the refining and processing facilities for these fuels and the pipelines, ships, trucks, and rail systems that transport these commodities from their source to systems that are dependent upon gas and oil in one of their useful forms. [21]

Task Force Comments: St. Joe Natural Gas is the service provide for areas with centralized service. Rural areas use propane tanks. Therefore, the Gulf County Task Force considered gas service loss a very low risk hazard.

Hazard Score: 8

Power Loss

Definition: Power loss refers to the disruption of electrical service to the community's residents, including generation stations, transmission and distribution networks that create and supply electricity to end-users so that end-users achieve and maintain nominal functionality, and the transportation and storage of fuel essential to that system.[22]

Task Force Comments: There are two electrical energy service providers in Gulf County: Gulf Coast Electric Cooperative and Progress Energy. Each services about 60% and 40% of the County, respectively, and operates separate systems. Power outages are commonplace during severe weather, especially hurricanes, but do not persist for significant periods of time.

Hazard Score: 20

Radiological Incident

Definition: Radiological accidents can occur wherever radioactive materials are used, stored or transported. In addition to nuclear power plants, hospitals, universities, research laboratories, industries, major highways, railroads or shipping yards could be the site of a radiological accident. Radioactive materials are composed of atoms that are unstable. An unstable atom gives off its excess energy until it becomes stable. The energy emitted is radiation. Radioactive materials are dangerous because of the harmful effect of certain types of radiation on the cells of the body. The longer a person is exposed to radiation, the greater the risk.[23]

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[21] Florida Department of Community Affairs, Division of Emergency Management website. http://www.floridadisaster.org/bpr/EMTOOLS/CIP/CIP.htm

[22] Florida Department of Community Affairs, Division of Emergency Management website. http://www.floridadisaster.org/bpr/EMTOOLS/CIP/CIP.htm

[23] Federal Emergency Management Agency website. http://www.fema.gov/hazards/nuclear/radiolof.shtm

Task Force Comments: There is a hospital in Gulf County using radiological equipment in its laboratory. In addition, according to the Task Force, radiological materials are transported via major roads by the Department of Transportation.

Hazard Score: 6

Sewer Service Loss

Definition: Sewer service loss includes the disruption of service to the community's residents of the facilities consisting of a system of sewers for carrying off liquid and solid sewage or waste pipes and equipment that carries away sewage or surface water.[24]

Task Force Comments: Most of Gulf County's unincorporated areas use septic tanks instead of centralized sewer service. Wewahitchka is particularly prone to sewer service loss when power service is lost. Without the sewer lift stations, there is often sewage backup.

Hazard Score: 24

Telecommunications Failure

Definition: Telecommunications failure includes a disruption of service to the community's residents of the networks and systems that support the transmission and exchange of electronic communications among and between end-users.[25] Telephone, cellular/mobile phone, cable/satellite television, and internet service are considered telecommunication services.

Task Force Comments: The County's telecommunications systems are rather vulnerable to failure. If there is power loss and a generator is not functioning, the County's entire telecommunications network may be lost. In addition, the Task Force feels that the County is especially vulnerable to cyberterrorism and viruses. Computer network failure could potentially cause Gulf County's entire computer system to crash.

Hazard Score: 36

Water Service Loss

Definition: Water service loss refers to the disruption of service to the community's residents, including the sources of water, reservoirs and holding facilities, aqueducts and other transport systems, the filtration and cleaning systems, the pipelines, the cooling systems and other delivery

[24] Online Dictionary website. http://www.thefreedictionary.com/
[25] Florida Department of Community Affairs, Division of Emergency Management website. http://www.floridadisaster.org/bpr/EMTOOLS/CIP/CIP.htm

mechanisms that provide for domestic and industrial applications, and systems for dealing with waste water and fire fighting.[26]

Task Force Comments: Most of the County's unincorporated areas and both municipalities are part of centralized water systems. Water service loss is common during severe weather.

Hazard Score: 28

Hazardous Materials

Definition: Hazardous materials are chemical substances, which if released or misused can pose a threat to the environment or health. These chemicals are used in industry, agriculture, medicine, research, and consumer goods. Hazardous materials come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. These substances are most often released as a result of transportation accidents or because of chemical accidents in plants.[27]

Task Force Comments: Hazardous materials coordination is the responsibility of the Gulf County Emergency Management Department along with local facilities that use or store hazardous materials. Hazardous chemicals are transported into and through the county on a daily basis via highway, rail, and barge. Over-the-road transportation is the most common method in Gulf County. In northwest Florida the most frequently transported chemicals over the roads are petroleum-related products including gasoline, diesel, fuel oil, and LP gas. Other commonly transported substances include nitric acid, sulfuric acid, and molten sulfur. Rail transportation of hazardous chemicals is limited to two railcars of sulfuric acid a month transported over the Apalachicola Northern Railroad to Port St. Joe. Each of the railcars carries approximately 180,000-200,000 pounds of sulfuric acid.

Hazardous chemicals are also shipped via barge though Gulf County Canal. Fuel oil, crude petroleum, and sodium hydroxide are the primary hazardous materials shipped by this method. In addition to the hazard created by the routine transportation of chemicals through the county, a hazard also exists from facilities storing large quantities of extremely hazardous substances (EHS) at their facilities. There are 12 facilities in the county that store EHS chemicals above the minimum threshold planning quantity designated by the US Environmental Protection Agency. Many of these facilities store chlorine gas, which is used for water treatment and purification. It is important to note that a variety of safety and security precautions in place at facilities storing these chemicals greatly reduces the potential for a significant release to occur. *Table 4.22* provides specific information regarding each of these facilities.

[26] http://www.floridadisaster.org/bpr/EMTOOLS/CIP/CIP.htm
[27] Federal Emergency Management Agency website. http://www.fema.gov/hazards/hazardousmaterials/

Table 4.22. Gulf County Fixed Facility Summary

Facility	Chemical	Vulnerable Zone	VZ Population
Arizona Chemical	Boron Trifloride	0.5 miles	350
	Cyclohexlamine	0.2 miles	350
	Formaldehyde		350
	Sulfuric Acid	0.1 miles	350
General Chemical	Sulfuric Acid	0.1 miles	2
GT Com	Sulfuric Acid	0.1 miles	150
Gulf Correctional Inst.	Chlorine	2.2 miles	1,550
Gulf Forestry Camp	Chlorine	0.5 miles	350
Lighthouse Utility	Chlorine	0.5 miles	200
Port St. Joe WTP	Chlorine	3.1 miles	4,500
Port St. Joe WWTP	Chlorine	3.1 miles	4,500
Premier Services	Sulfuric Acid	0.1 miles	100
Raffield Fisheries	Anhydrous Ammonia	10.0 miles	7,500
Wewahitchka WTP	Chlorine	0.5 miles	700
Wewahitchka WWTP	Chlorine	0.5 miles	1,200

Source: Gulf County Emergency Management Department, 2004.

Despite the routine shipment of hazardous materials through the county and the presence of large quantities of chemicals at a number of local facilities, there have been relatively few incidents involving the release of hazardous substances. *Table 4.23* describes hazardous materials incidents that have occurred in Gulf County between 1992 and 2004. Of the 33 incidents reported to the State Warning Point, the majority were transportation-related, originated from private sector firms, and involved the release of a petroleum-based chemicals.

Table 4.23. Hazardous Materials Incidents in Gulf County 1992-2004

Date	Substance	Amount	Description	Injury	Killed	Petrol	FTO*	Sector
6/15/92	Biphenyl -	39	Manufacture	0	0	N	F	Private
9/6/92	Oil	33	Ship	0	0	Y	T	Private
1/6/94	Propane	Unknown	Private residence	0	0	N	F	Private
4/13/94	Sulfuric acid	15,000	Manufacturer	0	0	N	T	Private
8/31/94	Boron triflouride	2	Manufacturer	0	0	N	F	Private
9/9/94	Biphenyl	5	Manufacturer	0	0	N	F	Private
9/16/94	Gasoline	813	Gas retailer	0	0	Y	?	Private
10/21/94	Boron triflouride	Unknown	Manufacturer	0	0	N	?	Private
11/20/94	Gasoline	130	Boat	0	0	Y	T	Private
2/6/95	Resin fire	Unknown	Manufacturer	0	0	N	F	Private
3/7/95	Gasoline	33	Auto accident	0	0	Y	T	Private
5/22/95	Oil	3250	Unknown	0	0	Y	?	Unknown
2/20/96	Diesel	195	Garbage truck accident	0	0	Y	F	Private
8/18/96	Raw sewage	5000	Lift station	0	0	N	T	Public
8/18/96	Raw sewage	5000	Lift station	0	0	N	T	Public
12/29/96	Diesel	1365	Vehicle accident	0	0	Y	T	Private
12/31/96	Diesel	Unknown	Unknown/sheen	0	0	Y	O	Unknown
5/11/97	Diesel	696	Sunken boat	0	0	Y	T	Private
11/16/97	Propane	Unknown	Pipeline	0	0	N	T	Public
1/12/98	Gasoline	195	Vehicle accident	0	0	Y	F	Private
1/17/98	Diesel	Unknown	Unknown	0	0	Y	O	Unknown
3/16/98	Oil	33	Boat incident	0	0	Y	T	Private
5/10/98	Oil	Unknown	Unknown	0	0	Y	O	Private
6/6/98	Natural gas	Unknown	Pipeline	0	0	N	T	Private
12/04/00	Gasoline/oil	370	Traffic crash	0	0	Y	T	Private
8/15/01	Gasoline	96	SWP10815-5183	0	0	Y	F	Private
9/13/01	Gasoline/oil	Unknown	SWP010913-5827	0	0	Y	T	Private
2/14/02	Unknown	Unknown	Hose from St. Joe Paper Co.	0	0	N	F	Private
8/4/03	Gasoline/diesel	Unknown	Vehicle leak	1	0	Y	T	Private
9/17/03	Natural gas	Unknown	Natural gas line cut	0	0	N	F	Private
1/31/04	Gasoline	Unknown	Overturned vehicle leak into creek	1	0	Y	T	Private
3/8/04	Gasoline/oil	Unknown	Sunken vessel with tanks leaking	0	0	Y	T	Private
5/25/04	Diesel/oil	185	Semi-truck overturned	0	0	Y	T	Private

*F=Fixed Facility, T=Transportation Incident, O=Off loading
Source: Florida Department of Community Affairs, Division of Emergency Management.

One of the primary concerns of the Task Force has been the placement of facilities for people with special needs (such as nursing homes or hospitals) in close proximity to major transportation routes or near fixed facilities storing large quantities of hazardous chemicals. Unfortunately, however, there are few locations in the county that are not within a short distance of

major trucking routes or within areas that could potentially be affected by a worst-case release from a facility storing extremely hazardous substances. Analysis of census data shows that approximately 71 percent of county residents reside within a hazardous materials vulnerable zone. It is important to note however, that incidents at fixed facilities have rarely occurred and transportation-related incidents in this region have been small in scale and highly localized in impact.

Hazard Score: 24

Crime

Definition: Crime is any act punishable by law such as murder, sexual offenses, robbery, aggravated assault, burglary, larceny, or motor vehicle theft.

Task Force Comments: Gulf County has the same problems with crime as any other rural county. *Table 4.24* shows the crime statistics for 2003 as reported by the Florida Department of Law Enforcement. The past two years have seen a marked decrease in the total number of arrests and the rate of non-violent crime.

Table 4.24. Crime in Gulf County, 2003

Category	2002	2003	Percent Change, %
Population	13,261	12,552	2.2
Total Arrests	765	650	-15.0
Total Index Offenses	379	274	-27.7
Violent Rate	633.4	642.0	1.3
Non-Violent Rate	2,224.6	1,379.9	-38.0
Index Rate	2,858.0	2,021.8	-29.3

Source: Florida Department of Law Enforcement website. http://www.fdle.state.fl.us/fsac/Crime_Trends/Map/33.htm

Hazard Score: 20

Civil Disturbance

Definition: Civil disturbance (or civil disorder) is a condition in society where people are engaged in several forms of disturbance such as parades, sit-ins, riots, sabotage, and other forms of crime. It is intended to be a demonstration to the public and the politics but can be easily evolved to chaos. Generally, the cause of civil disorder is discontent among people because of conditions such as economical stalement, inflations, a huge amount of unemployment and political scandal. [28]

Task Force Comments: The Task Force considers civil disturbance unlikely in Gulf County.

Hazard Score: 12

[28] Online Dictionary website. http://www.thefreedictionary.com/

Terrorism

Definition: Terrorism is defined in the Code of Federal Regulations as "the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives."[29]

Task Force Comments: As with civil disturbance, the Task Force considers a terrorist event in Gulf County highly unlikely. However, if an event were to occur, the water system would be the most susceptible.

Hazard Score: 18

Economic Crisis

Definition: Economic crisis includes localized economic recession, severe national or state recessions and depressions, and generally severe decreases in the productivity of the local economy that result in increased unemployment, poverty, and homelessness.

Task Force Comments: Gulf County is generally susceptible to adverse national or state economic conditions. The economy is relatively diverse for a rural community with representation in public administration; educational, health, and social services; retail trade and commercial; and agricultural industrial sectors. However, tourism from sports fishing drives the local economy.

Hazard Score: 18

Key Employer Crisis

Definition: A key employer is a firm or company that employs a significant number of the local residents and/or is a significant contributor to the local economy. Key employer crises often trigger local economic crises.

Task Force Comments: The key employer of Gulf County is the Gulf County Correctional Institution. It is highly unlikely that this facility will be closed in the near future.

Hazard Score: 18

[29] Federal Emergency Management Agency website. http://www.fema.gov/

Table 4.32. Gulf County Hazard Identification and Risk Estimation

Natural Hazards

There are no deviations for Port St. Joe and Wewahitchka.

Risk Characteristic		Natural Hazards															
		Score	Drought	Earthquake	Flooding	Hail	High winds	Infestation/ Disease	Landslide, Erosion	Lightning	Storm surge, Tsunami	Subsidence, expansive soils	Urban Fire	Wildfire	Winter storm	Volcanic activity	Dam/Levee Failure
Area Impacted	No developed area impacted	0		0												0	
	Less than 25% of developed area impacted	1				1		1			1	1	1		1		
	Less than 50% of developed area impacted	2	2				2		2					2			2
	Less than 75% of developed area impacted	3			3					1							
	Over 75% of developed area impacted	4															
Health and Safety Consequences	No health and safety impact	0		0					0							0	
	Few injuries or illnesses	1	1		1	1	1			1	1	1		1	1		1
	Few fatalities but many injuries or illnesses	2						2					2				
	Numerous fatalities	3														0	
Property Damage	No property damage	0	0	0													
	Few properties destroyed or damaged	1						1				1			1		
	Few destroyed but many damaged	2			2	1	2		2	2			2	2			2
	Few damaged and many destroyed	2															
	Many properties destroyed and damaged	3									3						

Risk Characteristic		Natural Hazards															
		Score	Drought	Earthquake	Flooding	Hail	High winds	Infestation/ Disease	Landslide, Erosion	Lightning	Storm surge, Tsunami	Subsidence, expansive soils	Urban Fire	Wildfire	Winter storm	Volcanic activity	Dam/Levee Failure
Environmental Damage	Little or no environmental damage	0		0						0		0				0	
	Resources damaged with short term recovery	1			1	1	1				1				1		
	Resources damaged with long term recovery	2	2					2	2				2	2			2
	Resources destroyed beyond recovery	3														0	
Economic Disruption	No economic impact	0		0													
	Low direct and/or indirect costs	1	1			1			1		1	1					
	High direct and low indirect costs	2						2		2			2	2	2		
	Low direct and high indirect costs	2															3
	High direct and high indirect costs	3			3		3										
TOTAL SCORE FOR NATURAL HAZARDS (Sum of value for Public Safety, Property Damage, Environmental Impact and Economic Disruption)		6	0	10	4	9	7	8	5	10	3	7	8	4	0	11	
Probability or Frequency of Occurrence																	
Probability of Occurrence	Unknown but rare occurrence	1		1								1				1	1
	Unknown but anticipate an occurrence	2															
	100 years or less occurrence	3				3											
	25 years or less occurrence	4	4				4				4				4		
	Once a year or more occurrence	5			5			5	5	5			5	5			
TOTAL RISK RATING FOR EACH HAZARD (Total Score for Natural Hazards) X (Score for Probability of Occurrence) =		36	0	50	12	36	35	40	25	40	3	35	40	16	0	11	

TOTAL RISK RATING FOR ALL NATURAL HAZARDS: 379
(Sum of Risk Ratings for Specific Hazards)

Technological Hazards

There are no deviations for Port St. Joe and Wewahitchka.

Risk Characteristics			Technological Hazards						
		Score	Gas service loss	Hazardous materials	Power loss	Radiological incident	Sewer service loss	Telecommunications system failure	Water service loss
Area Impacted	No developed area impacted	0							
	Less than 25% of developed area impacted	1		1	1	1			
	Less than 50% of developed area impacted	2	2				2		
	Less than 75% of developed area impacted	3							3
	Over 75% of developed area impacted	4						4	
Health and Safety Consequences	No health and safety impact	0							
	Few injuries or illnesses	1		1	1	1	1		1
	Few fatalities but many injuries or illnesses	2	2					2	
	Numerous fatalities	3							
Property Damage	No property damage	0				0		0	0
	Few properties destroyed or damaged	1	1	1	1		1		
	Few destroyed but many damaged	2							
	Few damaged but many destroyed	2							
	Many properties destroyed and damaged	3							
Environmental Damage	Little or no environmental damage	0	0		0			0	0
	Resources damaged with short term recovery	1					1		
	Resources damaged with long term recovery	2		2		2			
	Resources destroyed beyond recovery	3							

Risk Characteristics			Technological Hazards						
		Score	Gas service loss	Hazardous materials	Power loss	Radiological incident	Sewer service loss	Telecommunications system failure	Water service loss
Economic Disruption	No economic impact	0							
	Low direct and/or indirect costs	1		1	1	1	1		
	High direct and low indirect costs	2							
	Low direct and high indirect costs	2							
	High direct and high indirect costs	3	3					3	3
TOTAL SCORE FOR NATURAL HAZARDS (Sum of value for Public Safety, Property Damage, Environmental Impact and Economic Disruption)			8	6	4	6	6	9	7

Probability or Frequency of Occurrence

Probability of Occurrence	Unknown but rare occurrence	1	1			1			
	Unknown but anticipate an occurrence	2							
	100 years or less occurrence	3							
	25 years or less occurrence	4		4			4	4	4
	Once a year or more occurrence	5			5				

TOTAL RISK RATING FOR EACH HAZARD

(Total Score for Tech Hazards) X (Score for Probability of Occurrence) =	8	24	20	6	24	36	28

TOTAL RISK RATING FOR ALL TECHNOLOGICAL HAZARDS: 148
(Sum of Risk Ratings for Specific Hazards)

Societal Hazards

There are no deviations for Port St. Joe and Wewahitchka.

Risk Characteristics			Societal Hazards					
		Score	Crime	Civil Disturbance	Terrorism	Economic Crisis	Key Employer Crisis
Area Impacted	No developed area impacted	0					
	Less than 25% of developed area impacted	1	1	1			
	Less than 50% of developed area impacted	2					
	Less than 75% of developed area impacted	3			3	3	3
	Over 75% of developed area impacted	4					
Health and Safety Consequences	No health and safety impact	0				0	0
	Few injuries or illnesses	1		1			
	Few fatalities but many injuries or illnesses	2	2		2		
	Numerous fatalities	3					
Property Damage	No property damage	0				0	0
	Few properties destroyed or damaged	1	1	1	1		
	Few destroyed but many damaged	2					
	Few damaged but many destroyed	2					
	Many properties destroyed and damaged	3					
Environmental Damage	Little or no environmental damage	0	0	0	0	0	0
	Resources damaged with short term recovery	1					
	Resources damaged with long term recovery	2					
	Resources destroyed beyond recovery	3					

Risk Characteristics		Score	Societal Hazards				
			Crime	Civil Disturbance	Terrorism	Economic Crisis	Key Employer Crisis
Economic Disruption	No economic impact	0	0				
	Low direct and/or indirect costs	1		1			
	High direct and low indirect costs	2					
	Low direct and high indirect costs	2					
	High direct and high indirect costs	3			3	3	3
TOTAL SCORE FOR NATURAL HAZARDS (Sum of value for Public Safety, Property Damage, Environmental Impact and Economic Disruption)			4	4	9	6	6

Probability or Frequency of Occurrence

Probability of Occurrence	Unknown but rare occurrence	1					
	Unknown but anticipate an occurrence	2			2		
	100 years or less occurrence	3		3		3	3
	25 years or less occurrence	4					
	Once a year or more occurrence	5	5				

TOTAL RISK RATING FOR EACH HAZARD

(Total Score for Societal Hazards) X (Score for Probability of Occurrence) =	20	12	18	18	18

TOTAL RISK RATING FOR ALL SOCIETAL HAZARDS: 86
(Sum of Risk Ratings for Specific Hazards)

TOTAL RISK RATING FOR THE JURISDICTION FOR ALL HAZARD CATEGORIES: 611
(Sum of the total risk ratings for natural, technological and societal hazards)

Table 4.23. All Gulf County Hazards by Risk Rating

Hazard	Risk Rating
Flooding	50
Storm surge, tsunami	40
Wildfire	40
Landslide, erosion	40
High winds	36
Drought	36
Telecommunications system failure	36
Urban fire	35
Infestation, disease	35
Water service loss	28
Lightning	25
Hazardous materials	24
Sewer service loss	24
Crime	20
Power loss	20
Economic crisis	18
Key employer crisis	18
Terrorism	18
Winter storm	16
Civil disturbance	12
Hail	12
Gas service loss	8
Radiological incident	6
Subsidence, expansive soils	3
Earthquake	0
Volcanic activity	0

Repetitive Loss Properties

Another indication of the hazards threatening Gulf County is the frequency with which properties are repeatedly damaged by disaster events. The properties, which may be buildings, roads, utilities, or similar construction, are termed "repetitive loss properties." Properties can fall into this classification based on repeated damages from a variety of hazards, and the repetitive loss properties identified in Gulf County are listed in the report enclosed in this section, based on the cause of their prior repetitive losses.

A specific category of repetitive loss properties is those that are insured under the National Flood Insurance Program, and have had repeated claims for flood loss damages. Gulf County has had such properties designated and these are listed in a second repetitive loss property report included in this section.

Repetitive damage properties are properties insured with the National Flood Insurance Program (NFIP) that have incurred two or more losses in excess of $1000. There are

approximately 96 properties in Gulf County that meet the NFIP designation of a repetitively damaged property.

Repetitive damage properties are properties that are insured with the National Flood Insurance Program (NFIP) that have incurred two or more losses in excess of $1000. There are at least 31 properties in Gulf County that meet the NFIP designation of a repetitively damaged property. Twenty-three of the properties have suffered at least two losses while eight have suffered at least three losses. Cumulatively, these properties have recorded over $1.2 million in damages over the last 20 years. A number of the repetitive damage properties have suffered structural losses in excess of 50 percent of their property value.

It is important for local officials to be aware that millions of dollars in funding have been made available by the state of Florida and the federal government through the Hazard Mitigation Grant Program, the Flood Mitigation Assistance Program, and the Community Development Block Grant program to acquire or elevate repetitively damaged properties as they are responsible for a disproportionate share of flood damage nationwide. These programs provide the best opportunity for local officials to mitigate damage in flood prone areas, ensure an uninterrupted tax base, and diminish the burden placed upon local agencies in the pre-storm and post-storm environment.

Table 4.24. Gulf County NFIP Repetitive Damage Properties

Property Number	City	Cumulative damage		Total Losses	Total Paid	Property Value
		Building	Contents			
1	Port St. Joe	19,754.50	0.00	2	19,754.50	36,700.00
2	Wewahitchka	2,139.16	1,295.41	2	3,434.57	65,000.00
3	Gulf County	66,063.01	8,787.15	3	74,850.16	40,000.00
4	Wewahitchka	9,172.14	0.00	2	9,172.14	63,900.00
5	Bryants Landing	50,481.44	6,311.50	2	56,792.94	87,822.00
6	Port St. Joe	53,901.38	15,672.09	3	69,573.47	128,000.00
7	Port St. Joe	19,351.46	9,566.22	2	28,917.68	28,620.00
8	Wewahitchka	22,455.27	0.00	2	22,455.27	23,600.00
9	Wewahitchka	28,862.76	0.00	2	28,862.76	50,189.00
10	Wewahitchka	27,327.37	3,571.50	2	30,898.87	14,584.00
11	Howard Creek	18,623.95	0.00	3	18,623.95	30,000.00
12	Port St. Joe	16,019.65	7,278.09	2	23,297.74	33,124.00
13	Wewahitchka	38,623.24	4,832.86	3	43,456.10	46,800.00
14	Simmons Bayou	23,248.88	8,120.20	3	31,369.08	26,880.00
15	Wewahitchka	12,737.15	0.00	2	12,737.15	64,800.00
16	Gulf County	20,963.96	5,050.00	2	26,013.96	33,200.00
17	Wewahitchka	62,000.00	20,000.00	2	82,000.00	83,265.00
18	Wewahitchka	38,782.08	2,239.20	2	41,021.28	52,750.00
19	Port St. Joe	10,133.22	3,879.52	2	14,012.74	34,320.00

Table 4.34. Gulf County NFIP Repetitive Damage Properties (con't.)

Property Number	City	Cumulative damage		Total Losses	Total Paid	Property Value
20	Port St. Joe	82,371.13	15,000.00	3	97,371.13	N/A
21	Wewahitchka	14,300.00	0.00	2	14,300.00	42,361.00
22	Cape San Blas	114,301.00	500.00	2	114,801.00	182,400.00
23	Gulf County	78,824.54	0.00	2	78,824.54	95,000.00
24	Gulf County	76,645.00	7,959.65	2	84,604.65	150,000.00
25	Port St. Joe	41,962.11	0.00	3	41,962.11	167,750.00
26	Wewahitchka	40,737.99	4,701.71	2	45,439.70	38,760.00
27	Wewahitchka	14,613.43	1,744.15	3	16,357.58	51,300.00
28	Wewahitchka			2		
29	Port St. Joe	10,133.00	3,880.00	2	14,013.00	34,300.00
30	Indian Pass	2,822.00	0.00	2	2,822.00	83,500.00
31	Gulf County	54,745.00	21,000.00	2	75,745.00	84,000.00

Source: Florida Department of Community Affairs, Division of Emergency Management.

Critical Facilities

Critical facilities are facilities that are crucial to the maintenance of health, safety, and welfare of the county and its residents and visitors. The facilities include essential services such as water wells and tanks; sewage plants; medical facilities; government buildings; fire departments; food stores; local law enforcement agencies; and emergency service organizations necessary for responding to and recovering from a disaster. The following pages describe the critical facilities in Gulf County, organized according to the storm surge zone in which they are located. Given that nearly all development within the county is located within one mile of the coast, it is not surprising that many of the assets needed to help the community respond to and recover from a disaster are located in these areas as well. In fact, nearly two-thirds of the counties' critical facilities are located in areas that are projected to be inundated by a Category 3 hurricane. The vulnerable location of many of these assets places a great strain on the ability of the local governments to provide the services most needed in the aftermath of a major storm. From a planning perspective, it also makes sense to place critical facilities outside of the floodplain or other hazard zone, whenever possible.

The essential services these critical facilities provide make them excellent candidates for mitigation project funding. Indeed, the Hazard Mitigation Grant Program (HMGP), which funds hazard mitigation projects after a declared disaster, will consider the value of critical facilities' service to the community as a benefit when calculating the benefit-cost ratio for a proposed project. Other funding programs such as the Emergency Management Preparedness and Assistance Trust fund will give priority to critical facility mitigation projects identified in Local Mitigation Strategies.

For security purposes, the inventory of critical facilities has not been provided with the Gulf County Local Mitigation Strategy. As a public document, this plan may be viewed by anyone. Thus, releasing a list of facilities that are vital to Gulf County increases the vulnerability of these facilities to terrorism, crime, and other acts of violence or sabotage. A database of the critical facilities is maintained by Gulf County Emergency Management and is available by written request.

Future Vulnerability

In addition to profiling existing vulnerabilities and critical facilities, it is also important to describe vulnerability in terms of the types and numbers of future buildings, infrastructure, and critical facilities located in identified hazard areas in the Gulf County Local Mitigation Strategy. Infrastructure and capital improvement projects are on going as funding becomes available and listed in *Section 6: Compilation of Mitigation Initiatives*. Other critical facilities being contemplated are a new hurricane evacuation risk shelter in the Highland/Wewahitchka area, a temporary landfill for disaster debris, and a new outfall for Americus. These facilities are not expected to increase the vulnerability of Port St. Joe, Wewahitchka or the unincorporated areas of Gulf County to various hazards because they are either mitigation remedies to existing vulnerabilities or being constructed according the mitigation best practices. However, a number of large and small scale residential developments are being built within Gulf County that are expected to increase the population, as well as the number of residents that may be faced with hazards. Gulf County is currently taking administrative steps to ensure that substandard structures are not being built. In addition, the County has applied for funding to retrofit low-income "shot gun" housing.